

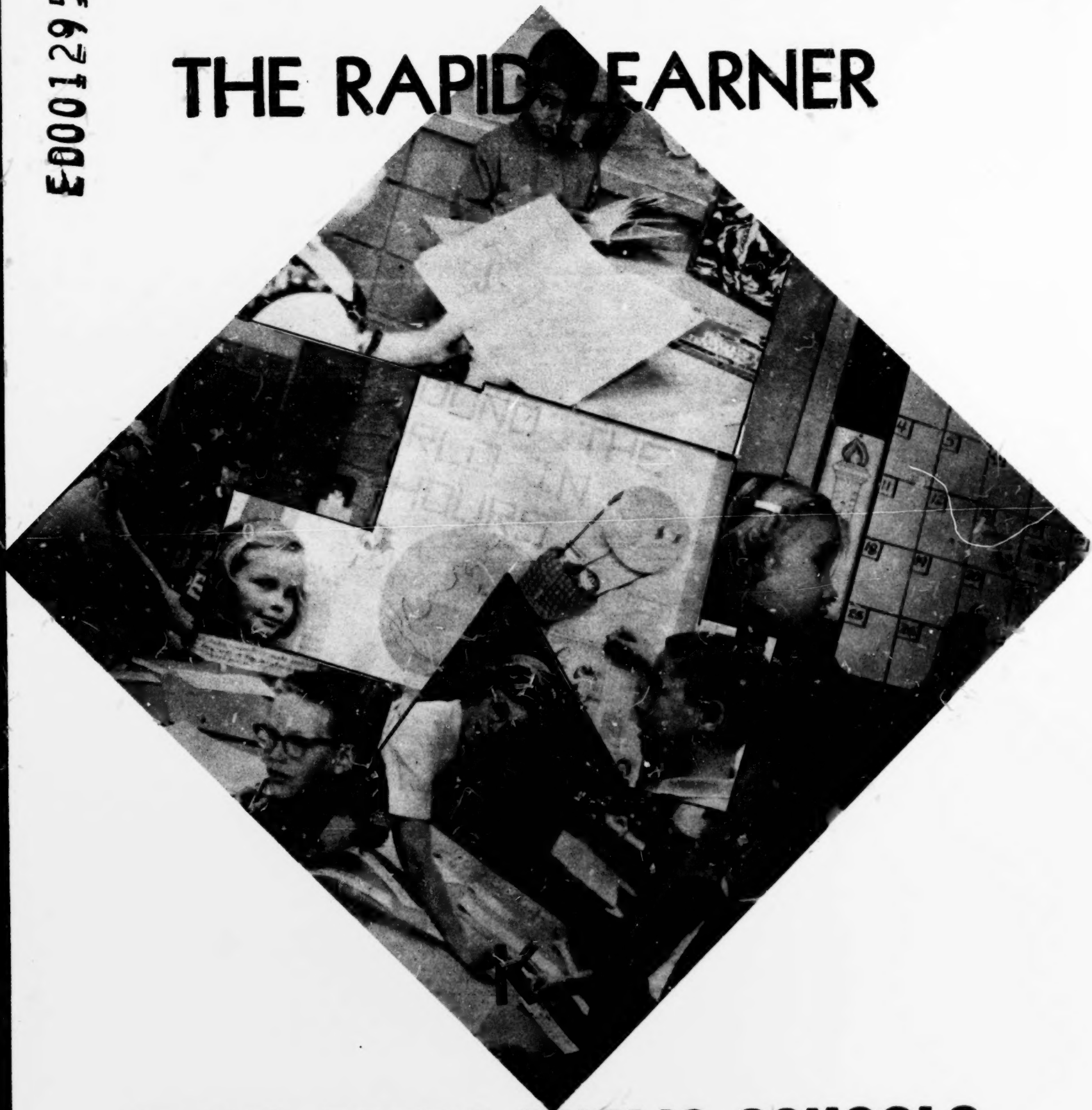
ERIC Document Resume		See instruction Sheet		DATE OF RESUME		DATE RECEIVED	
A. PUBLICATION DATA							
1. ERIC NUMBER E0001295		2. ORIGINATOR CONTROL NO(S). NA		3. IDENTIFICATION NO. NA		DO NOT WRITE IN SPACE BELOW	
4. AUTHOR(S): York, Gordon L. et al.				MICROFILM COPY AVAILABLE YES ☒ NO ☐			
5. TITLE OF DOCUMENT ABSTRACTED: The Rapid Learner: K-6				COPYRIGHT GRANTED YES ☐ NO ☒			
				COPYRIGHT RELEASE FILED YES ☐ NO ☐			
6. PUBLICATION TITLE: NA				TYPE OF REPORT		OTHER ERIC REFERENCES:	
7. EDITOR(S): NA		8. PLACE OF ORIGIN Grand Forks Public Schools ORG. ST. CITY, STATE Grand Forks, N.D. TELE. EXT. INST/LOC CODE		PROPOSAL ☐		ERIC SATELLITE CODE	
9. PUBLISHER OR SOURCE Grand Forks Public Schools Grand Forks, North Dakota				IN-PROGRESS ☐			
10. VOL. NA	11. PAGES NA	12. MO./YR. NA	13. TOTAL PP. 236	FINAL ☒			
				FOLLOW-UP ☐			
B. INDEXING DATA							
14. SUBJECT AREA				15. TYPE OF ENDEAVOR curriculum guide			
16. INDEXING TERMS (8-12)				curriculum enrichment			
rapid learners academically talented superior students elementary education							
teaching methods teaching aids teaching suggestions curriculum planning							
student activities student participation educational enrichment							
17. ABSTRACT (MAX. 250 WORDS)							
The motivating concept in the development of the syllabus was that the increasing complexity of the educational task demands that we make special provisions for those who learn more rapidly and who can progress through the curricular program at a greater speed. These students should be challenged through the use of a variety of materials and techniques. Techniques for indentifying the rapid learner include teacher observation of pupil characteristics, grades, achievement tests, and IQ tests. The suggestions for teaching are divided into the subject areas of: science, social studies, language arts, and mathematics. Within each subject area the material is presented at appropriate grade levels from kindergarten through the sixth grade. A bibliography is offered at each grade level along with a general bibliography for each subject area. The bulk of the material presented is in the form of short suggestions for specific student activities within each subject area and at each grade level.							
ERIC No.							
18. SOURCE OF ABSTRACT							
C. FUNDING DATA							
19. SUPPORTING ORGANIZATION				20. DIVISION OR DEPT.		21. CONTRACT NO.	
				22. TOTAL COST OF PROJECT		PROJECT NO.	
				23. DURATION OR PROJECT		U.S. Department of Health, Education, and Welfare Office of Education	

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THE RAPID LEARNER



GRAND FORKS PUBLIC SCHOOLS
Grand Forks, North Dakota

"There is nothing so unequal
as the equal treatment
of unequals."

- Marian Scheifle

FOREWORD TO SYLLABUS FOR RAPID LEARNERS

The materials in this syllabus have been developed under the leadership of Mr. Gordon York, principal of Viking School. He was ably assisted by a committee of dedicated elementary teachers and principals who devoted two years of study and effort in the preparation of these materials.

The philosophy statement adopted as a part of the Curriculum Study in 1961 reads in part, "It is the right of each child and youth to have an opportunity to attain the highest possible fulfillment of his potential through differentiated and varied curricular offerings." It was a commitment to this idea that gave rise to the planning of a special program for rapid learners in the elementary schools. The increasing complexity of the educational task demands that we make special provisions for those who learn more rapidly and who can progress through the curricular program at a greater speed. These students must be challenged through the use of a variety of materials and techniques. It is this concept that motivated the development of the Syllabus for Rapid Learners.

We firmly believe that the material contained in this syllabus will enable the classroom teacher to make definite plans to adjust the educational program of the rapid learner to challenge his mental ability and to fit his particular need. This report will give teachers clues to the interests, abilities, achievements, and social and emotional factors that will help them in setting up a program for each pupil. This syllabus, of course, is only a first step. Setting

up a functional program for each pupil presents a real challenge for the teacher and each teacher must devote considerable time to the planning of effective programs of enrichment for individual rapid learners.

The development of this syllabus is a very significant step in our Curriculum Study. Our sincere appreciation goes to those who participated in this program. This fine effort will be rewarded in years to come through an improved program for the academically talented pupils in the Grand Forks school district.

Richard E. Barnhart
Superintendent of Schools

FOREWORD

We have long known, perhaps always, that individual children vary greatly from one another in intellectual ways as well as in many other ways. We have not always taught them in ways that would make this knowledge fully effective in practice. Perhaps we never will for all children. Although we are making progress, we must come ever-closer in making teaching and learning match the individual differences of children. This handbook has been specifically designed to help us. Its effective use can and should result in higher quality education for the boys and girls for whom it is intended.

I want to express sincere appreciation to the members of the committee for preparing this treasure-house of challenging activities for rapid learners. The committee worked diligently and long, and with insight and excellence. The product is good. I earnestly urge teachers to make full use of it.

Walter M. Loomer
Coordinator Elementary Education

ACKNOWLEDGEMENTS

I would like to express appreciation to the following teachers and elementary school principals for their cooperation and continued effort in preparing this syllabus:

Mr. Charles Askegard - West	Mr. Carl Morken - Lake Agassiz
Mr. Arnold Bakke - West	Mr. Gordon Obie - Wilder
Miss Margaret Barto - Washington	Miss Berdella Overbye Belmont
Miss Anne Gallagher - Winship	Miss Patricia Purath- Viking
Miss Eleanor Harnit - Belmont	Mr. Robert Reinertson-Winship
Mrs. Pearl Johns - Viking	Mr. David Shearer - Wilder
Mrs. Ardys Larson - Lake Agassiz	Miss Jean Torkelson - Lewis & Clark
Mrs. Margaret Mason - Midway	Miss Emelia Vejtas - Belmont

Preliminary work on this study began in March, 1959. It was decided to prepare a manual of practical suggestions and resource materials that could be used by teachers of heterogeneous classes. The work would cover the areas of Science, Social Studies, Language Arts and Mathematics in grades Kindergarten through six. The basic premise was to provide suggestions that would be implemented into the traditional instructional procedures as horizontal enrichment.

Having developed a suitable format, the committee divided into four groups with each sub-committee responsible for a phase of subject matter. The sub-committees were headed by the following chairmen: Miss Patricia Purath, Miss Margaret Barto, Miss Anne Gallagher, and Mr. Carl Morken. These sub-committee chairmen met regularly with a steering committee composed of Mr. Bakke, Mr. Shearer, and the

Committee Chairman.

It is sincerely hoped that this study will be an aid in providing experiences which the academically talented pupil needs during the very important early years of education.

Gordon L. York, Chairman

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TECHNIQUES OF IDENTIFICATION

It is important that formalized methods of evaluation be used in identifying academically talented children. It is not the committee's intent to deny the value of teacher observation but to point out that personal and environmental factors may influence this evaluation. It is not uncommon for a child of ordinary ability to excel academically if he has traveled, has had access to books, magazines, pictures or has lived in a cultured environment. On the other hand, a bright child who is a behavior problem or is not motivated, or who has physical characteristics and mannerisms not acceptable to the teacher may be inaccurately evaluated by the use of only observation.

The committee recognizes that teacher observation, handled objectively, is often an excellent measure of academic potential. However, other means, such as mental and achievement test results and cumulative record study must be utilized in order that all the more able learners be identified.

Teacher Observation:

A check list has been made available to quickly and conveniently recognize those children in your class who have the physical, mental, and social characteristics commonly found in the academically talented pupil. This check list is to be used not only for the children in your room who are known to have an IQ of 125 or more, but also for

those who very nearly approach this score and for those who, in your opinion, exhibit superior mental abilities.

Pupils who exhibit the largest number of characteristics are those most likely to be academically talented and who also, perhaps, will have the greatest problems.

When using this roster, list the names of all your pupils, then indicate those who stand out in characteristic number 1, then number 2, and so on through the list. Be sure to make use of the "remarks" column. It is possible a child may exhibit some of these characteristics solely in order to gain attention and not necessarily because of superior intellect.

The committee recommends that this check list be completed after the first month of school and that constant re-evaluation be made during the year. Students will change and so will their characteristics.

IDENTIFYING CHARACTERISTICS OF INTELLECTUAL ABILITY

1. Learns rapidly and easily.
2. Uses a great deal of common sense.
3. Reasons things out.
4. Retains much of what he has heard or read.
5. Knows about many things of which most students are unaware.
6. Uses a large vocabulary.
7. Reads books a year or two in advance of the rest of the class.
8. Asks many worthwhile questions.
9. Is original and creative in thinking.
10. Is keenly observant and responds quickly.
11. Accepts responsibility and leadership.

12. Isn't easily hurt or discouraged.
13. Is respectful of rights of others.
14. Has a good attention span.
15. Is happy when feels well.

CUMULATIVE RECORD STUDY

Grades - Consistently high grades tend to indicate giftedness. The following should be considered in using them as a technique of identification:

1. Many children make high grades because of great effort.
2. Study habits are a factor.
3. Parental influence may encourage very high or very low grades.
4. Poor motivation will often adversely effect achievement.
5. Reading difficulty can obscure true ability.
6. Physical handicaps are often a deterrent to achievement.
7. Emotional factors may limit or hamper true ability.

A thorough study of past grades will be a valuable aid to the teacher in identifying her rapid learning child. Grades must be used only as part of the over-all evaluation procedures. Teacher observation and tests also play a major part.

Anecdotal Records - Anecdotal accounts are of doubtful value unless viewed with everything else we know about the student. They are often biased and tend to accent only a small segment of the students over-all performance. All teachers should scrutinize the "remarks section" of the yellow sheets. They often provide valuable

information about a student's behavior, performance, and attitudes.

Achievement Tests - Children who score consistently high in achievement tests are generally more able learners, but consideration should be given the following characteristics which tend to make a student of average ability appear to be more able than he actually may be:

1. Great effort.
2. Home environment.
3. Pressure to conform to peer group.
4. Special class values.
5. Excellent reader.
6. Competitiveness.

IQ Tests - The simplest and most satisfactory way to identify academically talented pupils is to use intelligence test scores. The California Mental Maturity Test is given to all fourth grade children. In special cases the Binet Individual Test may be given. In most cases, an IQ of 125 or over will identify a pupil as academically talented. When using these as a basis for evaluation, consider the following:

1. That the tests are reasonably accurate.
2. That the child has at least the IQ indicated by the test result.
3. That it is hard to accidentally get a high score.
4. That if a child's IQ doesn't seem compatible with other indications, have him re-tested.
5. That the highest score always be considered as the most accurate.
6. That tests represent only one facet of identification.
7. That the tests should never be permitted to be the sole determin-

ing factor.

8. That environment can retard or even "veto" a favorable heredity.

ABILITY ROSTER

#	Name	Characteristics	Total	Comments
1	Doe, John	1, 3	2	
2	Brown, Jane	1, 4, 6	3	
3	Jones, Bill	2	1	

S C I E N C E

The Rapid Learner can "explore the unusual" instead of advancing in the field. Awakening children to the use of all of their senses in their observations not only increases their perception but also their enjoyment of life. One example:

Fish: Sight - Color, texture of flesh, scales
 Feel - Coldness, scale textures, oiliness
 Smell - Distinctive
 Hear - Movement in water
 Taste - Distinctive

The following activities were chosen for the Rapid Learner because of their enrichment potential, their creative possibilities and their expandability.

Kindergarten, Grade 1, Grade 2

I. Living Things

A. Animals

1. Make an insect cage from an ice cream carton or a shoe box. Wire screen is stapled to "windows" cut in the sides of a cardboard box. A baking pan may be placed in the bottom and the cover of the box is replaced, or a cylindrical cereal box may be used in similar fashion. A simple but satisfactory home for earth worms may be made from a large pickle or jelly jar. The dark paper is placed around the jar so that the earthworms will stay close to the outside

and may be more easily observed.

2. Make a feeding station for birds. Bring it to school and place it outside a window. Let more able child direct the other children in feeding the birds.
3. Mount pictures of birds that migrate. Report on migration and why.
4. Prepare chart and record other children's report of return of certain species (checking against list of birds which usually winter in our locality for possible errors).
5. Report on classifications of birds as given in What is a Bird (perching, climbing, etc.). Report on Flyways, p.40 of What is a Bird.

Teacher aid: Mysteries of Bird Migration - Audubon Nature Society, 1130 5th Ave., New York - 15¢.
6. Collect bird nests. Identify nests by looking at pictures. Find out what materials the bird used to make the nest. Report where the nest was found.
7. Observe and identify as many birds as possible.
8. Make an illustrated chart showing ways to protect and promote bird life.
9. Prepare a question and answer game about helpful birds and the insects which they attack.
10. Watch a bird building a nest and give a report to the class. Observe how materials are carried, how long it takes to finish the nest, and other interesting nest-building habits. Bring in an old nest to show the class what it was made of

and how the materials were put together.

11. Collect pictures that show where different animals live.
Make a booklet.
12. Choose one family in the animal field and find pictures of its various members such as the "cat" family.
13. Be responsible for setting up and caring for an aquarium.
14. Collect pictures of animals that store food for winter.
15. Collect pictures of animals that change color for winter.
16. Collect pictures showing animals getting ready for winter and make a booklet.
17. The Rapid Learner can check the following books for hibernating animals: What is a Turtle, Benefic Press, What is a Frog, Benefic Press, and supervise a bulletin board about these animals.
18. Use plaster of paris to make impressions of the prints common neighborhood animals, leaves, or shells. The plaster can be mixed with water to form a creamy consistency. Pour this mixture on the animal track or other object to be preserved. When the plaster of paris has set, remove and compare with fossils if any are available. How can scientists speculate on the size of animals, their means of locomotion, the shape of animals, and the habits of animals from observing tracks made by animals?
19. Make an observation house for an ant colony. Use a clear glass quart jar that has a screw top. A block of wood placed in the center of the jar will keep the ants from

tunneling too far to be seen. Stock the ant house by digging into an ant hill. Wrap black paper around the outside of the jar to make it dark inside. Feed ants bread crumbs and sugar. Put a small dish of water on top of soil. Remove black paper when observing.

20. Scoop frog's eggs out of the water into a pail from a pond. Place them in a glass container of pond water so they can be observed. Class can see them hatch and watch the changes. Feed tadpoles tiny water plants. Use magnifying glass to observe them and draw pictures of the various stages of growth.
21. Take some mosquito larvae or wrigglers from a stagnant pool of water. Place them in a jar of water taken from the pool. Cover the jar with a piece of glass or a fine wire netting. Use a magnifying glass to observe the larvae as they change. Children will discover what is involved in an animal's change from water to land habitat.
22. Place the cocoons in a wire cage so the butterflies may be easily observed when they emerge from the cocoon. A cage can be made by using a plant container and some window screen. Make a wire-screen cylinder about a foot long and a little narrower than the diameter of the flower pot. Fill the container with soil. Stand the wire cylinder up on the soil and push it down in the soil so that it will stand erect. Cover the top of the cylinder with a thin piece of wood. If the cocoon is fastened to twigs it can be placed in the cylinder. If not, fasten to the screen or lay on the soil. It should be moistened occasionally. Observe

the butterfly emerge from the cocoon.

B. Plants

1. Collect many leaves. Mount on a chart or make a booklet.
Show how each kind of leaf is different.
2. Collect colored leaves. Arrange according to color change.
Find out why leaves vary in color and report to class.
3. Collect pictures of plants getting ready for winter and
make a booklet.
4. Make a chart of vegetables showing the part we eat.

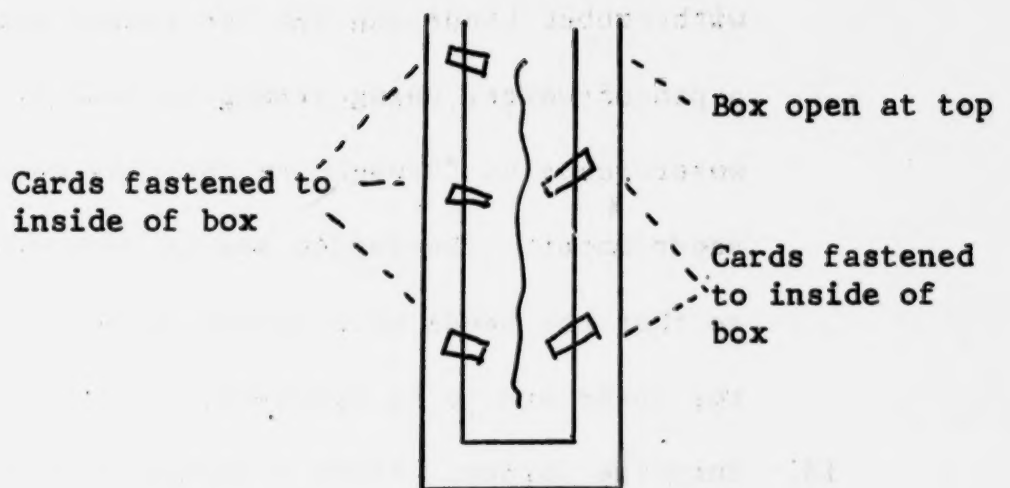
Roots - carrots, potatoes

Leaves - lettuce, cabbage

Stem - asparagus, rhubarb

Seed - corn, peas

5. Put a seed in water, another in soil. Watch growth of
each. (Need food in soil)
6. Place two plants in room of same temperature. Give both
same amount of water. Cover one tightly. Watch growth
of each. (Need air)
7. Put two plants in same room. Water one and leave other
dry. Watch growth of each. (Need water)
8. Objective: To show that plants need light and seek it.
Equipment: Box, inside of which 3 x 5 cards are fastened
to deflect light. Plant (preferably wander-
ing jew or similar vine)
Procedure: Keep plant sufficiently cared for, so nothing
retards its growth except deflection of light.



9. Plant one seed in a jar of sand and another in soil. Put both in places which have the same temperature. Water both. Observe which plant grows best.
10. Compare the length of time seeds take in germinating.
Equipment: Containers of soil, seeds of different sizes (radish, nastursium, bean). Calendar. Experiment: Plant seeds and mark boxes with seed name, mark the calendar as it emerges. Make a chart comparing the number of days it took for each seed to emerge.
11. Plants. How plants Make Food, How Plants Store Food - True Book of Plants (see index). Report and prepare an exhibit.
12. Pocket garden. Equipment: 2 pieces of glass same size (4" x 4"), beans, wheat, corn. Procedure: Seeds should be soaked overnight before used. Cut two or three pieces of blotting paper to fit between the glass. Lay one piece of glass flat on table, lay the damp blotting paper on the glass and put the seeds on the paper. Place second

piece of glass on seeds. Hold pieces of glass together with rubber bands and set the pocket garden upright in a pan of water, using stones to hold it upright. The water seeps up through the blotting paper and keeps the seeds moist. The garden may be covered with black paper so that the seeds will sprout better. Remove paper when the seeds are to be observed.

13. Surprise Garden. Place a sponge in a dish of water. Sprinkle some bird seeds over the sponge and watch the variety of sprouts.

14. Plants grow from seeds.

- a. Equipment: Beans, drinking glass and blotting paper.

Roll blotting paper and place inside glass so paper fits close to glass. Put seeds between paper and glass. Pour an inch of water in the glass. Wrap paper on outside of glass and fasten with rubber band to keep away light. Place in warm place. Take paper off every few days to watch growth. Roots go down and stems go up.

- b. Plants grow without seeds.

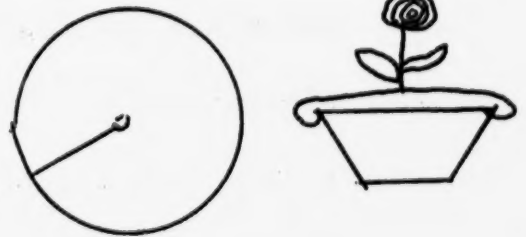
Plant sweet potato in a glass of water. Put glass in a warm place. If you keep water in glass you will soon have a beautiful plant. Can also grow a carrot plant by cutting about an inch off the top of a carrot. Cut off the leaves and put the carrot piece with the top up in a pan. Put the pan in a warm, sunny place.

In a few days look to see what is happening. You can also start a geranium plant by cutting a thick green piece from the plant and placing it in a glass about one-third full of water. After it grows roots you may put it in a flowerpot in dirt and it will grow into a new plant.

15. Collect and group seed to interpret their dispersal by wind, animal or human carriers, water, or explosion.
16. Plants give off water into the air.

Equipment: Geranium, wax paper, jar large enough to cover the whole plant.

Procedure: Cut paper thus:



Tape closely around stem and against the pot, or enclose whole pot in wax paper up to stem. Tie band rather closely to keep moisture in soil. Put a glass jar over the plant and in a few days water will have collected on the jar. (Scientists believe one big tree will give off as much as 100 tons in a season).

"Companion" experiment: Place pot of soil with no plant under another jar. Tape paper over top of pot as in other experiment. No moisture will collect on this jar. This proves that it was the plant that gave off the moisture.

17. Collect leaves from deciduous trees and from evergreens.

Compare the two types of leaves. Read to find out why some trees lose their leaves during winter and why others don't lose them.

18. Make a picture or word chart showing uses of plants for food for people, birds and animals.
19. Collect newspaper and magazine clippings, pictures, and advertisements showing man's uses of trees.
20. Collect pictures of animals' uses of trees.
21. Field trips. Trip to the florist: The Rapid Learner will be directed to notice the humid atmosphere, as well as the flowers, the type of leaf, color of foliage, and materials for displaying.
22. Finding out how plants reproduce. Plant an onion bulb, a slip from a geranium plant, a potato and a strawberry plant. Observe each in the first processes of growth.

C. Ourselves

1. Collect pictures of food and also pictures of sources of these foods. Classify pictures according to source.
Example: pork - pig; mutton - sheep; apples - trees.
2. Find pictures of food and classify according to type.
Example: apples, oranges - fruit; beans, peas - vegetables; pork, beef - meat.
3. Make charts or booklets of foods that constitute a good breakfast, lunch and dinner. Use for whole class.
4. Give a demonstration of proper brushing of teeth.
5. Develop "time charts" for deciduous teeth and their

eruption. (Boys and girls have different "probabilities")
They could explain about biting and grinding surfaces so
classmates would brush back teeth as well as front.

Follow-up research may be made on:

- a. What animals also lose teeth
- b. What animals use other means of masticating food

Source material - What is a Fish - Cow - Frog.

6. A unit on baby animals which are not like their parents at birth is "research" for the Rapid Learner. Example: Tadpole of the frog; caterpillars to the butterfly.
7. Collect pictures and make booklets of people getting ready for winter.
8. To illustrate to class the necessity of proper clothing for weather conditions: Paint one can black - leave the other unpainted. Punch a hole in top of each. Place a thermometer in each hole and put them in the sun. Observe how black attracts heat. Shows effect of color in clothing for cold or hot weather.
9. Safety and color.

Objective: To show that car lights can pick out certain colors we wear easier than others and certain combination of colors.

Equipment: Flashlight, various coats or pieces of cloth of solid colors, cloth with large and small prints and stripes; bicycle reflectors and

and tape could be added to this experiment.

Procedure: Use in dark room such as a storeroom.

Objective: To compare the heat-absorbing qualities of light and dark colors.

Equipment: Two similar vessels of snow, black and white paper to wrap them in.

Experiment: Wrap one in black paper, the other in white paper and set in the sun. In which container does the snow melt faster?

10. **Safety - Fire needs air.**

- a. Put a candle in a pumpkin and put the top on. The fire is extinguished. Cut out the jack-o-lantern-put in the candle - put on top - the candle burns because it gets air.
- b. Light a candle and set a lamp chimney over it so air can't enter the bottom. Cover top of chimney with piece of glass. Candle goes out. Set chimney on two flat-sided pencils. Remove the glass and relight the candle. It now burns brightly. If a smoking splinter is held near bottom of chimney, the smoke will move up past the flame. Shows air is moving. Demonstrates need of keeping windows and doors closed in case of fire.
- c. Set a short candle in a wide-mouthed jar. Light the candle. Then cover container with a large piece of cloth or put sand on top of fire or pour water on fire.

Have the Rapid Learners report on all the things we should do for safety in case of fire.

11. Wool is warmer than cotton. Fill three jars to top with hot water and cover them tightly. Wipe the outside of the jars dry. Pull a woolen sock over one jar - a cotton sock over another and leave the third jar as it is. Place all three jars in a cool place. Remove socks in a half hour and feel jars.

II. Non-Living Things

A. The Earth and the Universe

1. Collect pictures of mountains, deserts, oceans, lakes, and rivers. Make booklet.
2. Collect rocks. Show differences in color, shape, size, hardness, and softness.
3. Collect clay, sand, gravel. Put in boxes for children to see and feel. Observe which holds water the longest.
4. Fill a jar with water. Screw cover on tight. Put out in cold. Breakage of jar shows how freezing can break rocks.
5. Collect pictures of products obtained from the earth. Make a booklet showing uses of each product.
6. How mountains are formed.
 - a. Take several sheets of paper of different colors and textures and lay them flat on the table. Place your hands on the papers near the ends and push them toward the middle of the paper. The paper forms a "hump"

in the middle somewhat like a mountain may be formed by forces pushing on rock layers. If the paper could break, part of it would push past other parts to form a fault. The different colors and textures show how the layers would arrange themselves in a mountain.

- b. Place layers of different kinds of clay, sand, plasticine or gravel in a cardboard box. These layers should be moist (about "mud-pie" consistency).

After the layers are packed together, cut out the ends of the cardboard box; then put them in place again and push toward the middle. This forces the layers into a position resembling folded mountains. Cut down through the middle of the layers with a sharp knife and lift the two parts away from each other. Shows how mountains are formed.

- 7. Collect pictures of seasonal changes and make a booklet or chart of each season.
- 8. Keep a record of length of day and nights in each season for a period of time and report to the class.
- 9. Keep a record of the temperature for a certain period.
Keep a record of it on a calendar.
- 10. Weather Maps. The average first grade enjoys the "clock form" or calendar. The Rapid Learner would record temperature and North Dakota does have rapid changes which adds interest. Make the weather clock for the class.
Cut a large disk from stiff cardboard and divide into

- several sections. Label the sections: rainy, cloudy, snowy, foggy, fair weather, or sleeting. Paste in a picture showing type of weather indicated in each section. Make a pointer from stiff cardboard and fasten to the center. Move the indicator to type of weather whenever the weather changes. Makes children conscious of various changes in the weather during a period of even one day.
11. Place a plant in the dark and a similar one in the sun. Treat both plants alike except for the light. Observe growth of each. Why is there a difference?
 12. Watch the moon at night for a month. Report to class at various intervals. Whole class may learn reasons for changes in the moon. Observer-calendars shall be used to substitute observations of changes in the moon.
 13. Measure other children's shadows with strips of paper at different times during the day. Place objects in shady places and in direct sunshine. Why do the size of the shadows vary?
 14. Observe sun shining through a corner of an aquarium, a prism, soap bubbles or water being poured from one container to another in direct sunlight. Observe closely the varied rainbow-like colors. Why does this happen?
 15. Observe how air uses space.
Fill a bowl with water. Hold a glass upside down and push it to the bottom of the bowl. Tip the glass and watch the bubbles come out. Keep the glass tipped until all

the air has come out and there are no more bubbles. Now push it back down in the water and observe that the glass will now fill with water because air is out. How does this indicate that air occupies space?

16. Air - experimenting with ideas from What is a Rocket (Benefic Press)

Problem 1: To learn from experience why the rocket is pointed.

Equipment: Piece of paper, balloon.

Experiment: Decide on the target (certain desk in the room?), throw paper toward it (air pressure causes it to fall short of mark and course is uncertain). Throw balloon - course cannot be controlled. Finally, fold the paper into the shape of an airplane and throw it. The point will go rather directly toward the target and will reach it if force behind it is sufficient.

Problem 2: To show that thrust is not on the side that air is escaping

Equipment: Air-filled balloon.

Procedure: Start the balloon with the opening toward the objective - not the way it progresses. Try again, pointing the opening of the balloon in the opposite direction - body of balloon will go toward the objective just as rocket does. This shows the force of air in launching rockets.

Problem 3: Jet driven boat.

Put medicine dropper through hole in milk carton. Tie balloon so air will not go out while the end is being put over medicine dropper tip. Put tip of balloon below water. Put boat in large basin of water, clip the band holding air in the balloon so "jet" will put boat in motion. Force of air from balloon causes boat to move.

17. Air

- a. Purpose: To show air is real even if we cannot see it.

Equipment: Candle, balloon filled with air, or paper bag filled with air.

Experiment: Let air from bag extinguish the candle.

- b. Purpose: To demonstrate pressure of air on surfaces.

Materials: Crumpled paper, straight paper, paper folded into airplane, book on an empty paper bag.

Experiments: Blow into bag and book will be raised.

Throw - first the straight paper, then the crumpled paper, then the "airplane".

18. Weather. Moisture in air

Objective: To show that condensation is from moisture in the air rather than evaporation of water inside a vessel.

Equipment: Tissue paper to test moisture, clear glass of colored ice water.

Experiment: Be sure glass is dry on the outside when colored

water is put in. When moisture collects, wipe with tissue paper to see if it is colored.

19. Make drawings or collect pictures showing -

- a. Usefulness of rainfall
- b. Destructiveness of rain-storms

20. Rain

Problem: Making a rain gauge.

Equipment: Gallon can, smaller can, aluminum pie tin bent to slope to the middle (make small hole in the center).

Procedure: Pour water in gallon can to one inch in height.

Then carefully pour this amount into small can and mark its height on the can or on a stick placed in it to make a gauge. Divide this measure into smaller amounts, put little can in the big one and put the pie plate on top to catch precipitation. (suggestion: by setting the small can in clay the child won't upset it).

Cans should be painted to prevent rust. Snow can be measured for depth in a gallon can; then melted and compared with rain depth in small can. (10 inches of snow usually equals one inch of rain moisture.)

21. Install a weather vane in a strategic spot and make records of the prevailing "local" winds.

22. Prepare a two column chart showing the good and bad effects of wind. Collect pictures of wind damage.

23. Experiment with the pressure of water. Punch holes in a container of water at different levels and note from which one water squirts the farthest.

24. Examine snowflakes through a magnifying glass. See that each flake has six points and no two are alike.

B. Matter and Energy - Physical and chemical change.

1. Evaporation, rain. Put equal amounts of water into several saucers, glass covers on several. Put on radiator. The uncovered ones evaporate; drops on covered ones can be made to fall by tapping, demonstrating how rain falls in the cooling air. Different forms of precipitation depend on the temperature. Very cold air turns rain to snow or hail. With help, child could make simple explanation of "dew", frost (note refrigerator as example), or hail.

2. Evaporation and air. To show what happens to the air in water when it is exposed to sunshine. (Fish need air in their water - cool water hold more air than warm).

Equipment: Glass of water, sunny window (or radiator)

Experiment: Observe water as the heat warms it and escaping air becomes visible in bubbles. Therefore fish need cool water.

3. Find out whether snow or ice has more air in it.

Equipment: 2 aluminum breadpans.

Procedure: Fill one with water and let it freeze. Fill the other one with snow to the same height. Let them melt and measure the remaining water in

in both cases.

4. Change of form. Ice melted to water (solid to liquid).
Evaporation of water (liquid to gas). Melt paraffin. Let paraffin cool (solid to liquid - liquid to solid). Child may observe and report on changes from one form to another around him in the kitchen from the refrigerator and stove.
Example: Dissolving salt and sugar in water, freezing water, boiling water.

5. Determine temperature and movement of air by observation.
Direct pupil to watch birds, smoke, trees, people, and any other thing that will give him a clue. Have him report to the class.

6. Observe different kinds of thermometers in school, at home and elsewhere. Demonstrate and tell how they are different or similar to class.

7. Listen to radio reports on weather and watch it on television and report to the class.

8. Collect pictures showing different kinds of weather. Mount and tell how people and animals change the things they do when the weather changes.

9. Wind - Fanning a wet spot on the blackboard or blowing on wet ink to dry it, enables child to see the effect of wind.
Amount of surface exposed - Use 3 pieces of cloth a foot square. Use 1/8 cup of water to wet each. Hang one on hot-air register, one at room temperature and one with a fan or register blowing on it. Record the length of time it takes each piece to dry.

10. Condensation. Place some ice in a tin cup. Stir and note droplets of water on outside surface. Put hot water in another tin cup. Observe results. No moisture on outside of tin cup filled with hot water. Note that cup with ice in it cooled the air in contact with it, and cooled air cannot hold as much moisture as warm air in vapor form so droplets appeared. Have child observe situations where condensation is taking place such as cold water pipes and faucets, pitchers of cold water, blowing on cold windows or mirrors. Have pupil observe different places outside and in where condensation is taking place and report to class.
11. Remove all moisture from a clean jar. Place a shallow dish of water in the covered jar. Let stand overnight. Observe condensation of drops of water inside the jar. Tap jar gently to make it rain.
12. Pour a glass of hot water into a bottle. Rest a piece of ice on top of the bottle. Hold the bottle in front of a strong light. See the warm damp air rise. It meets the cool air under the ice and tiny drops of water form in the damp air as it is cooled. When the damp air meets the ice, real fog forms. What you see swirling up and down the bottle is fog.
 - a. Warm moist air settling on grass is dew.
 - b. Warm moist air rising a little higher is fog.
 - c. Warm moist air up in the sky is a cloud.
13. Put a glass of warm water in a teakettle and boil the water.

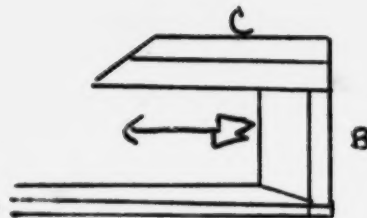
Fill a saucepan with cold water and hold it over the kettle so the steam hits the side. Cooled steam will form drops - (rain). If set in a freezing place, the drops will form frost, snow, sleet, or hail.

14. Magnets and Electricity. Making a compass (p. 121 & 123
Science Experiments by Parker)

Equipment: Strong bar magnet, steel knitting needle. Lay needle flat on table. With magnet, stroke 50 times from one end to the other, always in the same direction, and NOT back and forth. (It will keep its magnetism.)

Making a compass:

- Equipment:
- a. Block of wood $3 \times 3 \times \frac{1}{2}$
 - b. Piece of wood $\frac{1}{4} \times \frac{1}{4} \times 4$
 - c. Piece of wood $\frac{1}{4} \times \frac{1}{4} \times 2$

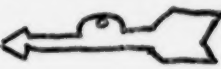


Brass brads $\frac{3}{4}$ in. long (not nails, because they are steel)

Steel darning needle, silk thread, small piece of paper

Instructions:

- a. Mark line  down middle of block (a) and place block (b) upright about a half-inch in on block (a). Fasten with brad.
- b. Put 2 inch stick (c) on the upright (b) in line with dotted line on (a) and fasten with another brad.

- c. "Notch" that stick to hold thread.
- d. Cut paper into arrow the length of needle, according to following diagram - 
- e. Magnetize needle with south pole of magnet.
- f. Tie thread through hole on arrow () and suspend to "scaffold" having arrow at least an inch above. (Do not have any magnets or iron or steel near by)

If nothing interferes the needle will act like a magnet. Let the child prove that the needle will always turn north by moving the magnet around in different directions.

15. Objective: To show that magnets will work through several mediums even if they will not pick them up.

Equipment: Paper clips, magnet, paper, cloth, empty glass wood, glass of water.

Procedure: Child experiments with above materials to see which can be picked up with the magnet. Place the things that can be picked up under those that cannot be picked up to show magnetic force is strong enough to work through non-magnetic materials.

16. Magnets. A magnetic duck:

Equipment: A flat cork $1\frac{1}{2}$ inches in diameter, a large darning needle, a sheet of unruled paper, paraffine.

Make the darning needle into a magnet by stroking it with one

pole of a bar magnet. Push the needle through the center of the cork so that about $\frac{1}{2}$ inch of it is below the cork. Make two paper ducks - flaps on bottom of each. Color the upper side of each. Hold the two ducks together, colored sides out. Bend the rounded flaps outward in opposite directions. Put one duck on each side of the needle which extends up through the cork. Paste the ducks together. Paste the flaps to the top of cork. Draw the duck through the water with a magnet.

17. Move a toy boat through the water by placing paper clips on boat and moving magnet near them in the water.
18. Place steel paper clips or thumb tacks in a box, in an empty drinking glass, in a bowl of water, or in a plastic tray. Experiment to see which clips can be picked up with a magnet through these various materials.

19. Static electricity.

Materials: Cellophane box with a lid 6 inches long, 4 inches wide, 2 inches deep, small sheet of tissue paper to make dolls. Make a row of dolls one inch tall -

Rub lid with your hand or piece of fur or wool to produce static electricity. Dolls will stand up alone on the lid.

20. Run rubber comb through hair.
21. Rub glass jar with silk or nylon.
22. Rub feet across wool rug.
23. Rub inflated balloon against wool.
24. Run rubber comb briskly through hair and then put near a thin stream of water from the faucet. The water will be de-

flected toward the comb through static electricity.

25. An electrified fringe:

A sheet of thin typewriter paper, a piece of fur or heavy woolen cloth. Cut a fringe along one side of the sheet of paper. Hold sheet of paper fringe down against blackboard. Stroke the paper downward a dozen times with the fur or wool. Then hold the sheet of paper by the two upper corners and lift it away from the wall. Watch the fringe. The separate strips will stand out away from one another.

26. Have child find what electricity does for us in school and at home and report on it.

27. Testing whether sound travels through wood and water.

Materials: A pencil, bare wooden table top, battery, jar filled with water, two small pieces of rock.

Method: Tap table with pencil in vertical position so point does the tapping. Now put ear to table and repeat exactly. Have someone pound rock together 6 inches from ear. With your ear against jar have someone tip the rocks together under the water. Does the sound travel?

28. Sound. To learn what vibrates to make sound. How sounds are changed in pitch and loudness, what influences the quality of the sound.

a. Drums: Place small rolled-up bits of paper on drumhead - will "dance" when drum is beaten. Play with sticks - then cover sticks with paper or cloth - use hands on drum.

Note differences in sound.

b. Xylophone: Note long strips make low notes just as piano long strings. Short strips make the high notes.

c. Piano: Length of strings - feel piano for vibrations. Note high and low note sounds.

d. Pitch: Demonstrating tension effect and width of band.

Equipment: Thumb tacks to hold rubber bands tighter and tighter, chalk box.

Method: Stretch the bands to farthest tacks and compare with first sound.

e. Ways to prove triangle vibrates:

1). Hit it and then put in water; note the waves made by it.

2). Hit it then touch with finger nails, feel vibrations.

3). Hit it; listen; stop it - will hear no sound.

f. Make a paper funnel. Talk through funnel to make voice louder.

29. Flower pot chimes. Arrange flower pots of graduated sizes on a rope in a vertical position. Tie rope to any object that will allow flower pots to be suspended in the air. Tap flower pots and note different sounds.

30. Scale with drinking glasses. Fill glasses with different amounts of water. Tap glasses. Experiment with the amounts of water.

31. Saw pieces of hardwood to graduated lengths. Arrange in different ways and tap with large iron nail. Experiment with

different lengths, arrangements and materials for taper.

32. Heat. Collect pictures of the different sources of heat such as coal, gas, and electricity. Report on how heat helps us. Following experiments could be used in report:

a. Put dishes of water in places of unequal temperature to see how heat helps evaporate water.

b. Place wet clothing on radiator or near warm place and in cold place to see how heat helps dry them.

33. Heating expands metal. Use a clean, dry, empty jar with a screw top. Turn cover on tightly so it can not be easily opened. Run hot water over the top until cover is hot.

Cover is now easily removed. Heat expands metal.

34. Place a coin on a piece of ice. Watch it melt a round place in the ice. Heat moves from warm things to colder things. Experiment with different materials to see which are good conductors of heat.

35. Heating expands water. Fill a bottle with water. Put in the cork in which a hole has been cut for a glass tube. Mark water height on tube with a string. Heat bottle and observe how water rises or expands. Water may be colored to enable easy observation.

36. Heating expands air. Fasten a rubber balloon over the top of a bottle. Set bottle in hot water and watch the balloon fill up.

37. List methods of heating homes such as hot, air, hot water, and radiation. Work out experiments to show the principles of heating.

- a. Air carries heat. Use a lamp chimney and a candle.

Light the candle and set the chimney over it on two blocks to raise it above table surface. Note the warm air at the top of the chimney. Hold a smoking stick at the bottom of the chimney and the smoke will show the air moving to the top of the chimney. Moving air carries heat.

- b. Water carries heat. Fill Pyrex baby bottle nearly full of water and heat at the bottom. Hold a thermometer in water at top. Water at top will get warm as the water carries the heat. Some grains of sand placed in bottle will show how currents are traveling. The unequal heating of water causes currents.

- c. Heat carried by radiation. Light a candle and hold paraffin alongside of it. Paraffin melts on side near candle by radiation. Child can list other objects that radiate heat such as toaster or waffle iron.

- d. Solids carry heat. Place a spoon in hot water and feel it from time to time.

List uses of heat insulation found around us - such as pot holders and ice cream bags.

38. Light. Experiment with different materials in sunlight and out of it to demonstrate that something shiny reflects in the sunlight. Observe reflections on different materials.
39. Balance. Build two towers of blocks of equal size and kind. Make one tower with a small base and the other with a broad base. Observe what happens.

40. See-Saw. Place a long board on a box with equal length on each side. Put an empty box on one end and a heavy object on the other. Have child fill the empty box with objects until it balances the object on the other end of the board.

Machines

41. Wheel and axle. Fill box with blocks. Pull box across the floor. Put another box in a wagon. Fill it with blocks and pull wagon across floor. Demonstrates how wheels help make the moving of heavy things easier.
42. Windlass. Put a broomstick through the holes in a wooden box. Tie one end of a rope around the broomstick. Tie other end to various objects. Child experiments with hoisting objects by winding the rope on the broomstick.
43. Find examples of the use of gears, such as egg beater, or bicycle. Collect pictures of objects which are operated by gears and make a booklet.
44. Inclined plane. Roll heavy objects up and down plane. Then lift objects up and down. Observe which is easier. Observe where the plane is used in loading and unloading heavy objects from trucks.
45. Lever. Put board under a heavy box. Pull down on end of lever. Demonstrate how box can be lifted this way when it couldn't be moved by same person by directly lifting the box. Observe how the same principle applies in things around such as hammer to pull nails, scissors, nut-cracker, or can-opener.

46. Pulley. The flagpole shows the use of a pulley.
47. Have children bring in real machines or pictures to demonstrate and tell how they work.

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concept of gravity.

S C I E N C E

Grade 3

I. Living Things

A. Plants

TRAVELING SEEDS

1. Materials: Hand lens, pan of water, seeds such as beans or corn. Place seed in water and allow to soak until seed coat is soft. Take off coat and break seed into two parts. Use hand lens or low power microscope to observe little plant inside. Note tiny white leaves and small root.
2. Materials: Box of soil, pea or bean seeds, thin board.
Plant seeds and cover small area with board. Dig a couple up after several days. Note change in seeds. Continue doing this every two days. Remove thin board when it is noticed the plants have begun growing. Note difference in these plants from others in sunlight. It is interesting to watch what happens to a seed as it is growing. Place good soil in a container and plant several seeds of the same variety. Take out one seed each day and note the progress. Someone may write down the date and the observations of the group.
3. Plant fast growing seeds such as oat seeds in two containers. When the seedlings are an inch high, cover one vessel with a box having a hole on one side. From time to time lift the box and note the direction of growth. Turn the box

so that light comes from a different direction.

4. Cut paper napkins to fit the bottoms of two jars. Put two napkins in each jar. Mark the jars #1 and #2. Put enough water into jar #1 to wet the napkins. If the napkins become dry, put more water in the jar. Do not put water in jar #2. Put five seeds on the paper in each jar. Cover both jars and put them in a warm dark place. Look at the seeds every day.
5. Plants from stems. Cut a slip from the branch of a rose bush. Make a hole in the soil. Pour water into the hole. Put the cut end of the slip into the hole. Press the soil around the slip. Cover the slip with a glass jar to keep the slip from drying out. Try this also with house plants.
6. How trees grow. If you can find a tree stump that has recently been cut or a block of wood, examine it. Look for rings or layers. If the stump is from a tree recently cut, look for a moist layer between the heartwood and bark. Sap may be oozing out of it. This is the water-carrying and the growing layer.

GRASS

7. Materials: Carrot, onion, grass and roots, knife. (Show how carrots will grow from just a small cut of carrot) Cut open a carrot and notice the stored food inside. Take the onion apart. The pieces that come off are really leaves, but they are thick because of the stored food. Look at the white stems that were underground on the grass. The food

stored here will help the grass grow.

B. Birds, Animals and Amphibians

BIRDS

1. A bird chart is always an interesting project. One suggestion for such a chart is as follows:

OUR BIRD CHART		
Birds	When Seen	Where Seen

A chart such as this may be used any season of the year. It may be an individual project as well as one done by a group.

REPTILES

2. Turtles and other reptiles. Prepare a box with rocks and earth in the bottom as a home for a frog, a turtle, or a garter snake. As cold weather comes, keep it in a cool place. Occasionally take it into a warm room. How does the animal behave? What does it eat? Make a study of it in every way possible.
3. Examine a piece of snakeskin to see the scales. Look at a turtle's shell made of scales and notice the scales on the turtle's neck and legs.

ANIMALS IN WINTER

4. Materials: Plaster of paris, can, water, and spoon. Find animal tracks in field or woods. Mix a plaster of paris solution such as is used in molds. Pour mixture in tracks. Let it harden. Remove cast and try to learn what animal made the tracks. A form in the shape of a circle or square may

be placed around the track before pouring.

5. Find pictures of animals that have sharp teeth and claws, that are protected by color, and that protect themselves with their hoofs and those who protect themselves with horns.
6. Place a feeding shelf in a nearby tree. Put some shelled nuts and some whole nuts on the shelf. Which nuts do the squirrels carry away? Which ones do they eat while sitting on the shelf?
7. Look for a spider. Catch one and put it in a jar. Use the cover to push the spider down into the jar. Make a home for it out of an aquarium. Watch it make a web. Place a live fly in the spider's home. Watch what happens when it flies into the web.

TOADS AND FROGS

8. Materials: Drinking glass, water. Fill a drinking glass with water and let it stand awhile. Look at it. You will see bubbles along the side of the glass. These are bubbles of air that come out of water. A fish has gills which help it breathe this air in water.
9. Materials: A sheet of white paper and a sheet of black paper. Take the sheets of paper outside and hold them over your head. Which is harder to see against the bright sky? The white paper is and so it is with the underside of a frog. A fish looking for a frog to eat cannot see it easily because the fish is underneath looking up at the frog against the bright sky.

C. Human Body

TEETH

1. Materials: Tooth X-ray. Secure an X-ray of your teeth from the dentist. Try to find any spots of decay. Can you tell where it takes place most often? Tell the class why.
2. Material: Tooth. Bring a tooth that either you or some member of your family has recently had pulled. Identify the different parts of your tooth.

HEARING SOUNDS

3. Material: Rubber band. Stretch the rubber band and pluck it with your finger. Listen. Stretch it further and repeat the action. What can you tell about stringed instruments from this?

II. Non-Living Things

A. Earth and Universe

SUNSHINE

1. Materials: Ball, bright bulb. Sit in chair near bright bulb and hold up ball so the light shines on it as the sun does on the moon for a full moon. Now turn the ball slowly to the left. The shape seems to change to show why we see a half moon. When you have turned half way around you will see only a little of the lit-up side or a quarter moon. Keep turning and note the moon shape change a little at a time until it's a full circle again.

WATER IN THE AIR

2. Materials: Paste, pan. Put some paste in an open pan. Let

- it stand in the air for a few days. What happens to the water in the paste? Try adding a little warm water to the paste. After you stir in the water, what is the paste like?
3. Materials: Teakettle, water, and empty bottle or jar and hot plate. Heat some water in the teakettle. Hold the empty glass bottle near the spout. How does the bottle feel? What made it hot? The heated water is very hot and turns to steam. The steam pushes its way up. The furnace in schools does this also.
4. Show how the moon travels around the earth. Put a globe in the center of the room. Make a circle on the floor. The globe should be near the center of the circle. Put the wagon on the line. The globe is the earth. The wagon is the moon. The line is the path the moon takes. Sit in the wagon and have someone pull you around the line. Do you see that the same side of the wagon is always toward the earth?
5. Muddy Water. Materials: Filter paper, soil, water, 2 jars. Stir the water and soil in one jar, mix well. Place filter paper (in cone shape) over the opening of the second jar. Pour the stirred soil and water solution into second jar. Notice what is left in the filter from the muddy water.
6. Materials: Soil, jar, and water. Put soil and water in jar. Let stand for awhile. Slowly pour off the water and soil that did not sink. Take some soil from the bottom of the jar. Feel it. It has small pieces of rock, doesn't it?

Sunlight, wind and water caused these pieces of small rock to break from a larger rock.

7. Make your own dew and frost. Materials: Ice cubes, glass and water. On clear nights we find little drops of water on plants. Where did the dew come from? Let's find out. Put some ice cubes in a glass. Fill the glass with water. In just a short while, drops of water will form on the outside of the glass. This works better if there is plenty of water in the air. Because of the ice cubes, the glass of water is cold. The outside air is warm. When this warm air touches the cold glass, the water vapor in the air turns into drops of water on the outside of the glass.
8. In the winter you may see frost on the windowpanes. What has happened? It is cold outside and warm inside. The moisture in the air inside comes in contact with the cold window. There it turns into water and is frozen into pretty designs. On a cold day, blow on a windowpane and see what happens.

B. Matter and Energy

FIRE AND AIR

1. Materials: Candle, match, piece of cardboard. Light the candle and hold your hand near the side of the flame. Move it closer and farther away. Tell what you found out. Place the cardboard between your hand and the candle. Tell if the heat travels around the cardboard. Then explain why it is warmer in sunlight than in shade.

2. Materials: 2 chalkboard erasers and electric light (or hot radiator). Clap the erasers over the electric light. See the chalkdust moving up over the light. When air is heated it rises. It will flow up higher and move across the room. Now hold the erasers under the lamp and clap them again. Notice how the chalkdust is carried up by the cool air moving in.
3. Materials: Long board, block of wood. Put a long board on a block of wood. Ask a man to stand on one end of the board (the short end). Push down on the other end and you can lift the man. Now try it with the man on the long end. Is it hard to lift him? When you are farther away from the block, it is easier. You are using a lever.

MAGNETIC POLES

4. Materials: Rubber ball, rod or bar magnet, compass. Make a hole through the rubber ball. Pretend this is the earth. Push the magnet through the center of the ball. Hold a compass near and observe the needle. (Be sure the magnet is in reverse from actual N-S pole position) Why do compass needles point north? The earth does have a core of metal.
5. Materials: Plastic spray coating, iron filings, magnets (various shapes) and white paper. Lay the white paper on top of the magnets. Sprinkle with the filings. Notice the magnetic fields of force; spray with plastic for a permanent record of your find.

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S C I E N C E

Grade 4

I. Living Things

A. Plants

1. Growing plants indoors. Observe that stems grow upward.
 - a. Potted plant.
 - b. Tip the pot on its side and make observations for several days. Will the stems bend and grow upward?
2. Water in plants. To show how surprisingly large an amount of water a plant gives off.
 - a. Materials: flowers, leaves, and drinking glass.
 - b. Put flowers and leaves in a dry drinking glass. Cover the top of the glass with a piece of cellophane held tightly in place by a rubber band. Put the glass in the sunlight. After a few hours, the inside of the glass will be thickly covered with water droplets.
3. Find leaves and look for the parts of the leaves that carry water. Find out more about how desert plants can live where there is so little water. Find out if there is much water in a peach or in an apple. First, weigh one of these fruits. Heat it for a long time in an oven. Then weigh it again. The heat made the water evaporate from the fruit. Was there much water in the fruit?
4. A chart or charts may be made to show all the different kinds of plants that can be found growing in the neighbor-

hood. They may be grouped according to annuals, biennials, and perennials. Pictures may be drawn or cut out of seed catalogs for illustrations. (Discovering with Science)

B. Animals

1. Birds.

- a. Birds in Winter: Make a bird feeder. Observe and make notes of the birds that come to feed. Note their movements, kind of beaks, and what they eat.
- b. Make maps of North and South America. Use markers to show where some of the birds go for the winter. Try to find out reasons why they go south.
- c. The number of birds seen here during the winter is relatively few. The youngsters may like to jot down the names of those they do see and this list could be continued on into the spring. Pictures, either hand-drawn or taken from books or magazines, would help everyone to recognize more easily the various kinds of birds.

2. Insects.

- a. Fruit flies. You can raise fruit flies easily. Boil some corn meal for five minutes and pour into a clean jar. Drop in a grape or a piece of banana. Fold a piece of paper towel and put that in, too. Leave the jar near some spoiling fruit until six or eight flies are inside. (Or you can catch them.) Then put cotton in the top. Leave the jar in a warm place and watch it.

- b. A field trip. Various types of insects may be caught and observed. If possible count their legs and their wings. They may be looked at under a microscope or other projector. If viewed under the projector they may be drawn and parts labeled.
- 3. Bring in a hibernating animal, such as a gopher or a woodchuck. Make a list of the different ways in which animals hibernate.
- 4. Make a chart showing ways that all reptiles are alike.
 - a. Covered with scales
 - b. Either short legs or no legs at all
 - c. Cold-blooded
 - d. Breathe with lungs
- 5. Select a reptile about which to make a chart or booklet. Stories of how they live may be written and pictures may be drawn to illustrate. Information included may be such as what they eat, what they do during various seasons, what homes they live in, and their life stages.
- 6. By using modeling clay, the youngsters will be able to make models of various reptiles which will make a good display. The Wonderworld of Science.

C. Human Body

- 1. Show a first aid kit. Examine the items it contains and point out various possible uses of each item. Suggest situations in which a first aid kit might prevent serious disability or save a life.

2. Gather and tabulate the accident records for your school to find out what accidents are most common.
3. Show X-ray photographs and diagrams of fractured bones of the arm or leg. Explain how a broken bone is set. Give reasons why the application of a cast or splint is necessary while a broken bone heals.
4. List the recommendations for the treatment of cuts and burns. Demonstrate possible first aid.

II. Non-Living Things

A. Earth and Universe

1. Earth and its movement.

Demonstration: On the floor mark a large oval. Two youngsters will be needed for this demonstration - one will stand in the middle of the oval while the other will represent the earth and will walk on the oval marking. As the "earth" moves to the east, he will at the same time spin around. Upon reaching his starting point, a year will have passed. (Discovering with Science)

2. Demonstration: Only a flashlight and a piece of chalk are needed. First, hold the flashlight so that the rays hit straight down on the floor. Now have someone draw circle (with chalk) on the floor. This will be around the part where the light is shining. This is to show us what a small area is lighted by straight rays. Now the flashlight should be held so that the rays hit the floor at an angle. Again have the lighted area enclosed by a chalk

mark. The difference this time will be that a much bigger section is lighted, but secondly, it is not as bright.

These experiments will make clearer the concept of seasons.

3. Keep the daily time of sunrise and sunset. This will enable the youngsters to note the big difference during the course of a school year.

4. Day and night. Make your own day and night.

Materials: Table, lamp, small globe, and dark room.

Procedure: Put the globe and the lamp on a table. Take the shade off the lamp and turn on the light. Turn off all other lights. The light is your make-believe sun and the globe is the earth. Notice how one-half of the globe is lighted. The other half is dark. It is daytime on the half of the earth which faces the light. It is nighttime on the other half. Put a bit of soft clay on the place where you live. Keep the clay on the dark side of the globe. Then turn the globe slowly from left to right. That's how the earth turns. When the clay begins to come into the light, that is sunrise. As you keep turning the globe, the clay comes to the middle of the lighted side. It is noon now. As you continue to turn the globe, the clay leaves the light. That is sunset, and then it is night once more.

5. Find the temperature of soil in different locations. Try such places as sunny or shady areas; places where there are plants or grass growing or only the soil. Discovering with Science.

6. Compare types of soil. Select various soils and then plant seeds in these. See which kinds of soil produce the best results under the same growing conditions. Science for Here and Now.

7. Make your own dew and frost.

Materials: Ice cubes, glass, and water.

On clear nights we find little drops of water on plants. Where did the dew come from? Let's find out. Put some ice cubes in a glass. Fill the glass with water. In a short while, drops of water will form on the outside of the glass. This works better if there is plenty of water in the air. Because of the ice cubes, the glass of water is cold. The outside air is warm. When this warm air touches the cold glass, the water vapor in the air turns into drops of water on the outside of the glass.

In the winter you may see frost on the windowpanes. What has happened? It is cold outside and warm inside. The moisture in the air inside comes in touch with the cold window. There it turns into water and is frozen into pretty designs. On a cold day, blow on a windowpane and see what happens.

B. Matter and Energy

1. Airplanes. A machine that flies.

An airplane's propeller is something like a big fan. It helps to make the airplane move forward. If you have a small electric fan and a pair of roller skates, you can

show how a propeller makes an airplane move forward. Put a book on two skates on a smooth floor. Place the fan on the books. Be sure fan is turned off. Connect the fan so that it starts working. (Don't get near it or you might get cut by the fan blades.) See how the propeller moves your machine across the floor. (Pull out the electric cord before the fan and skates hit something.)

- a. It is suggested that gliders or model airplanes be constructed. An additional feature would be to have a contest when the models were completed.
- b. A diagram may be drawn showing the parts of an airplane.
- c. Moving air exerts less pressure. Cut a strip of writing paper about one inch wide and the length of your paper. Fold back about a half inch at one end and hold this against the lower lip. If you blow hard the strip of paper will lift itself and flap as long as you blow hard enough. The moving air on the top of the strip exerts less pressure than the air on the bottom. Therefore, the strip lifts itself.

This is the principle used in making airplane wings.

2. Static electricity. Puffed rice electric fireworks
(attraction and repulsion)

Materials: Comb, puffed rice, and bowl.

Procedure: Rub a comb with a woolen or silk cloth and then plunge into a bowl of puffed rice. Draw the comb out

ALL KINDS OF
WEATHER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
				1	2
4	5	6	7	8	9
11	12	13	14	15	16
18	19	20	21	22	23
25	26	27	28	29	30

SCIENCE

and hold it still. Many pieces of rice will cling to it but after a second or two they will absorb electrons from the comb. Then they can't get away fast enough and will pop off in all directions. If fireworks aren't as active as they should be, heat the puffed rice in a pan in the oven before doing the experiment.

3. Make electricity move water - power of electricity.

Stand at a sink and run cold water. Turn the faucet so that the smallest possible continuous stream of water flows from it. Then charge your comb with electricity by rubbing it on the coat sleeve and move it slowly toward the water. The electricity in the comb will attract the neutral water. When the comb is about an inch away from the stream, the water will bend over toward the comb. Once you have water under control, you make it wriggle like a snake by moving the comb toward it and away from it.

4. How to "taste" electricity.

Materials: Paper clip, piece of thin copper wire, lemon.

Procedure: Push a straightened steel paper clip and a piece of thin copper wire into a lemon. Hold the ends of the wires close together but not touching and put them on your tongue. You will feel a slight tingle and taste something metallic. These are caused by the current of electricity generated by the battery of two different conducting materials and the acid in the lemon.

II. Non-Living Things

B. Matter and Energy (continued)

5. Things that dissolve. Water dissolves substances.

Materials: test tubes, water

Procedure: Heat helps dissolve solution. Put a half teaspoonful of salt in the test tube and shake. Now add another half teaspoonful and again shake. Repeat until some of the salt remains undissolved. You now have a solution which contains all the salt it will dissolve. Now heat the test tube over alcohol lamp, moving the tube while you are heating it. Can you dissolve more substance by heating the liquid?

6. Water is capable of dissolving a surprising amount of many chemicals.

Materials: Cup, lukewarm water, photographer's hypo. Fill a cup with lukewarm water to the top. Now carefully drop some photographer's hypo in the cup without spilling any of the water. This shows that much space exists between the particles of water.

7. Effects of heat. One way to make invisible ink is mentioned in our own text, but there are additional ways of doing this. A toothpick may be dipped into a little bit of milk after which write a few words with the toothpick on a clean sheet of plain white paper. The paper is then to be held over some heat. This heat will cause the milk writing to turn brown and the youngsters

will be able to read it.

A variation is to use lemon juice and then go over the paper with an iron. This should produce the same results.

8. Lenses. Assemble the various kinds of lenses that are available. Find out just how they work and what purposes they serve.

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S C I E N C E

Grade 5

I. Living Things

A. Plants

1. Plants and light

- a. Construct a model of a leaf.
- b. Report on the products of trees.
- c. Run a test to find out what percent of a given group of seeds germinate.
- d. Collections of different types of seeds are interesting.
- e. Report on how seeds travel.
- f. Make a model greenhouse.
- g. Make a report or collection of different kinds of bark of trees.

2. Flowers and Their Work.

- a. Soak several bean seeds overnight. Next day place the seeds, sand and blotter paper as shown, in the glass. Make notes on a chart of the daily changes you observe:

Water

Sand

Seeds

Blotter

Seeds must be next to the glass surface so that they can be observed.

- b. Find out from a reference book how each of these

things help grow a healthy plant: root hairs, water, minerals, carbon dioxide, leaves, chlorophyll.

- c. Learn the structure of a bulb. Secure some fairly large onions from a grocery store. Students may see the layers of thin dead leaves on the outside and thick, fleshy, living leaves within. Have the students cut through the onion until they find the stem in the center.
- d. Compare the growth of an onion bulb with that of onion seed. Secure a small package of onion seed and a few onion bulbs. Plant the seeds just below the surface of the soil in a box; plant the bulbs in another box. Students may note which began to grow first.
- e. Compare the weight of a bulb before and after growing. Weigh some onion bulbs. Plant them in a flowerpot. When they have grown vigorously for some time, pull a bulb out of the soil and note what has happened to it. The bulb should be much lighter, since the food has been used to a large extent.
- f. Grow bulbs without soil. Plant some narcissus bulbs in a shallow vessel in which stones have been placed and in which water is kept. Students should note that the bulb is growing without soil and that it may bloom. Emphasize that much of the food needed by the plant comes from the bulb.

B. Animals

1. Insects that work together.

- a. Secure an ant farm and study the feeding habits, working habits and community life of ants.
- b. Collect as many different kinds of ants as you can. Count the number of legs on each insect. Try to see the head, thorax and abdomen of each different insect.
- c. Make a killing jar. Hollow out part of a cork. Dip a piece of cotton in finger nail polish remover and place the cotton in the hollowed out bottom of the cork. Secure the cork in a bottle. Insects placed in the bottle will die, their muscles will remain relaxed, making mounting more convenient.
- d. Watch insects when out of doors and keep a list of any work you see them doing. You might, for example, see: (1) an ant milking an ant cow, (2) a bee gathering pollen, (3) a wasp or wasps making a nest.
- e. Collect several kinds of pollen and examine them under a microscope.
- f. Take a field trip to hunt for insects. (An ant colony may be found in field by turning over a few big stones.) Make a list of those found and where you found them.
- g. Keep watch for a dead bee. When you get one, look at it under a microscope. Look for these things: sting, tongue, eyes, pollen baskets, wings, breathing spiracles.

h. Find an empty wasps' nest. Notice how layers are put on. Look carefully at the opening. Why is it at the bottom instead of the top? Under a microscope examine the layers of paperlike material and rows of cells. See if the nest is cut through from top to bottom.

2. For use with the electric microscope some students might use the discs of cardboard, and mount specimens such as a fly's wings. Use the instructions included with the electric microscope set.

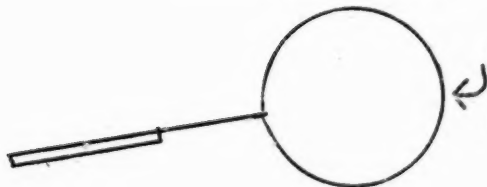
3. Make a net for collecting insects. Materials needed: wire coat hanger, a light stick or broom handle, about 30 inches of folded cheesecloth.

4. Net for collecting insects

Procedure: Bend coat hanger like this →



Fasten to stick by using a plier.



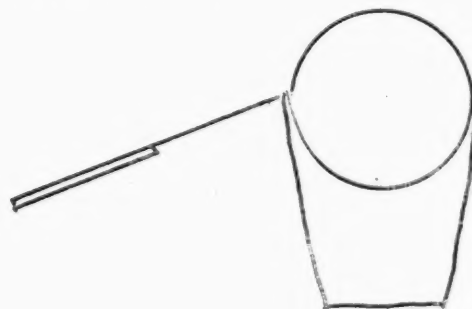
Cut your cheesecloth in this shape →



Sew up the sides and bottom so it becomes a bag like this:



Sew the bag onto a wire to look like this:



Make a zoo cage in which to keep your collected animals. Use a couple of pie tins and a piece of screen.

5. Read and give a report on Snow Tracks by Jean George, 1958, Dutton.
6. Show significant tracks from other book pages by using the opaque projector.
7. Make a bird nest collection.
8. Make drawings of animal feet.
9. Make a study of kinds of beaks of different birds.
10. Make a study of native birds of North Dakota.
11. Make a model beaver dam.
12. Make a collection of teeth from different animals.

C. Human Bodies

1. A simple test for the presence of fat or oil in a food is to rub the food on a piece of paper. If it leaves a shiny spot that you can see through, the food contains lots of fat or oil. Test some foods and keep a record.
2. Starch in food can best be tested by droplets of iodine. A blue or purple color shows that starch is present. Keep a record of various foods.
3. A way to examine some of your cells with a microscope: Scrape the inside of your cheek with a toothpick. Spread the scraped material on a glass slide. Add a drop or two of iodine that has been thinned with water. This will

color the cells and make them show up better.

4. Read about Anton vanLeeuwenhoek who was the first person to see cells under a microscope.

5. Find out how the circulation of the blood was discovered.

This name will help the student: William Harvey.

6. Find out how the pulse beat changes from a period of rest to a period of exercise. Make a chart showing the rise

of pulse rate during or right after vigorous exercise.

II. Non-Living Things

A. Earth and Universe

1. Rock Collections. Collect rocks and minerals on trips.

(May exchange specimens with friends in other parts of country.) Rock societies publish small magazines listing names and addresses of people wanting to make exchanges.

Some specimens may be purchased.

Hardness sets. Minerals used in scale of hardness. Sets of rock forming materials.

a. Types of specimens -

Those of worth as agates or veined lucky stones.

Uniform specimens

Crystal)
) for each
Massive or grainy form)

Freshly broken piece

Trim to a neat shape 3 x 2 x 1½ inches

* For remainder of this refer to single copy thus

marked.

2. Make a cross section drawing of a dam showing how the water is used to produce electricity.
3. Make a model water wheel and demonstrate for the class.
Use a tin can cover. Cut slits in the cover and bend the tin down. Place a nail through a hole punched in the center of the lid and pound the nail into a block of wood.
4. Report on how rivers have influenced man. Early civilizations established along rivers, transportation and communication and power recreation and fisheries might be possible topics.
5. Report on the formation of Grand Canyon.
6. Find out how the Red River Valley was formed.
7. Report on glaciers.
8. Write to the Geology Department of the University of North Dakota for a free collection of labeled rocks. (sample collection)
9. Streams at work.
 - a. Make a report showing ways people are working together to save soil.
 - b. Make arrangements for a speaker to talk about soil-saving. This might be a farmer or county agent or other person prepared on the subject.
 - c. Make a bulletin board display of pictures of eroded lands.

- d. Collect books and pamphlets on the subject of conservation.
 - e. Find a piece of land to study. It may be a bank of a stream. Watch what happens to this land during the year. Look at it after each storm. Watch it during the spring of the year in the wet seasons.
10. Make a small Christmas tree stand out of concrete. Use paper cartons as molds. Be sure to oil any surface to be released from the concrete after it is set. Use a stick for the opening for a small tree branch. In art class these stands may be decorated.
11. Make a collection of rocks. Try to find some that contain fossils of animals. Learn to identify each kind of rock.
12. The winter sky.
- a. Make models of planets showing relative size.
 - b. Report on meteors.
 - c. Make drawings of Analemma showing the sun's declination for every day of the year.
 - d. Make drawings of the sky for different months of the year showing the position of stars.
 - e. Make a scale representation of the relative distance of the planets from the sun.

B. Matter and Energy

1. Controlling fires.
- a. Report and demonstrate methods of making fire used in ancient times.

- b. Do reference work and report on the construction of fireproof buildings.
 - c. Look up kindling temperatures of various common materials such as natural gas, wood, cellophane, cotton, and paper.
 - d. Discover what substances are used for fireproofing.
 - e. Report on how fire sprinkler systems work.
 - f. Make a drawing of common type fire extinguisher, labeling the various parts and contents.
 - g. Report on the primitive religious practice of fire worship.
2. Energy and chemical reaction. Sharpen matchsticks and place them in a cork and concentrate the sun's rays on the matchheads with a hand lens causing the matches to light.
3. Prepare a pictorial chart showing the water cycle.
4. A candle flame consists of a cool inner part surrounded by a hot outer layer of burning wax vapor. When the flame is steady, hold a match stick in it for a moment. You will find the stick charred only at the two places where the hot outer mantle of flame touched it. The middle is clear because it was in the cooler vapors of the inner part.
5. Put a tablespoon of common baking soda in a half cupful of water. Stir the water and soda. Stand a short candle in a glass. Pour the water and baking soda into the

glass. Be careful not to get the wick of the candle wet. Light the candle. Pour a little vinegar into the glass. Watch what happens. Be able to explain the reason.

6. Students may do oral and written reports on subjects such as:

Why we should protect our forests.

How forest fires may start.

What happens to birds and other animals in a forest fire.

How forests help save the soil.

Make a map showing where our National Forests are located.

7. Sugar and Starch

- a. Some students can report to the class on how our bodies digest sugar.
- b. There are many related topics which can be taken from the reference books or encyclopedias. Some of these might be: arrowroot, tapioca, sago, dextrin, corn-starch, carbohydrate, and cellulose.
- c. Put a teaspoon of starch into half a glass of water in a small pan. Heat over a low flame while stirring with a spoon. When the starch is boiled, as it is here, or when used in the laundry, the tiny grains break open and form a jelly-like paste. Put a few drops of starch paste into a fresh glass of water. Starch seems to dissolve but a simple test shows it

does not really do this. Cut a small hole in a cardboard and hold it between a strong lamp and the glass of starch water. You will see the beam of light where it goes through the liquid because the starch particles scatter the light. This does not happen in true solutions. Try sugar water to see the difference in appearance.

8. Warm Weather Indoors.

- a. Keep a temperature chart for a month. Write down temperature each day at noon. Notice how the outdoor temperature of air changes.
- b. List types of heating systems common to our locality. Students may find pictures and diagrams illustrating these types. A bulletin board display might be made by rapid learners for the benefit of other students also.
- c. Some students may like to report on other possible ways of securing heat, such as heat from the interior of the earth, and heat from electrical energy.
- d. Some might report on the ways in which heat travels. (Radiation, conduction, and convection)
- e. Conduct experiments testing efficiency of various types of insulation such as fiberglass, mica, paper, wood, and others. This can be done by use of a light bulb and thermometer in a box with various types of insulation around it and a means of timing the various types of insulation heat try-outs.

may be lit from either switch as in a house where bulbs are turned on at two different places.

10. Rainbow colors.

- a. Make a pinhole camera.
- b. Make and demonstrate a color wheel.
- c. Report on lenses and show the mathematics of multiple lenses.
- d. Build a periscope.
- e. Make a study of colored lights and how it is accomplished.
- f. Report on materials which give off light.

11. Lifting things.

- a. Make a model of a boat, car, train, elevator or any other object.
- b. Make a display or drawings or models of different kinds of bearings.
- c. Make a demonstration or report on hydraulics.
- d. Report on how altitude effects the running of a car.
- e. Make a study of the kinds of wheels.
- f. Make a study of the uses of levers.
- g. Construct some of the simple machines.

12. Boats

- a. Find out how to figure the number of tons a ship can carry.
- b. Make a toy boat.
- c. Learn the meaning of such terms as bow, port, star-

board, bridge, deck and aft.

- d. Demonstrate how a metal ship can float using metal foil or tin and showing that, even though heavier than water, articles will float if they are the proper shape.

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S C I E N C E

Grade 6

I. Living Things

A. Plants

1. Plants that are not green.

- a. With the use of a microscope, capable students could grow and identify certain types of mold.
- b. If a micro projector is available, some students may go into a more detailed study of bacteria, learning to identify the three classes of bacteria by shape.
- c. To grow bacteria secure two or three dozen shallow glass dishes. The glass coasters used to keep bed casters from marring floors will do. Cut 5 cm squares of window glass to make covers. For beginning experiments, slices of potato, carrot, or sweet potato will serve as soil upon which to grow the bacteria. Cut slices of these foods about 6 or 8 mm thick and large enough to fit easily into the dish. In preparing the gardens for bacteria, care must be taken to keep everything clean. Wash the food slices thoroughly, wash and dry the dishes and the covers. Place dishes and covers on clean white paper. Be sure hands are clean. When all is ready, lift the food slices into the dishes with toothpicks or wood splints. Tie the covers on. Place the dishes in a

large pan and bake them in an oven at 120° for an hour.

This should kill the bacteria inside the gardens.

- d. When the bacteria gardens have cooled, place them out on the table but do not raise the glass covers until you are ready to plant them. Toothpicks make good gardening tools. Place 30 or 40 toothpicks in a covered can and bake them in the same manner as described above. Remove them one at a time with tweezers. Secure bacteria from as many sources as possible. Try: A piece of rotten or decayed fruit, a decayed tooth, dirty money, or dirt from under fingernails. Touch the toothpick to the source of the bacteria and then quickly raise the cover of a sterile garden. Rub the end of the toothpick over the potato slice and then replace the cover. Be sure to raise the cover as little as possible to keep out bacteria and molds that are in the air. Tie the covers on tightly again and set the dish away in a dark warm place for a few days. When they are examined the bacteria will show up as spots on the potato slice. Each spot is a colony of thousands of bacteria.
- e. Make "Science Says" posters such as, "Science Says Yeast Plants Multiply by Budding."
- f. Consult encyclopedias and other references to discover the ways in which bacteria help us.
- g. Read the book "Microbe Hunters" by Paul DeKruif.

h. To secure different types of molds --

- 1) Orange with green mold, keep in dark place for a few days,
- 2) Piece of moist bread in jar, expose to air and leave for a few days in dark warm place,
- 3) Piece of blue or Roquefort cheese in which there is mold, place in a jar and keep in a dark warm place,
- 4) Place a few dead flies in some stagnant water.
(In a few days they will be covered with a white growth of mold.)

i. To culture mold plants transfer mold from each of the above sources to a sterile culture dish which has prepared potato slices or gelatin. After four dishes have been set aside in a dark warm place for a few days we may have pure cultures of each of the four types.

j. To prepare sporeprints make a collection of mushrooms. Practice transfer of mold from one material to another by use of sterilized and unsterilized needle.

B. Animals, Birds, Fish

1. Bird Study

- a. Do research on why and where birds migrate.
- b. Make maps showing bird migration routes.
- c. Consult Animal Travels by Bertha M. Parker and Thomas Parker, 1948

2. Fish Life

- a. Report on fish hatcheries.
- b. Prepare a report on what is being done to conserve our fish life.

3. Prehistoric animals

- a. Hunt in books about the cavemen for picture of animals the cavemen drew on the walls of their caves.
- b. Tell one way in which the mammoth and the mastodon were fitted for living in North America during the Great Ice Age.

4. Birds

- a. Three famous bird travelers are the Golden Plover, Pacific Golden Plover, Artic Tern. Trace their routes.

5. Activities

- a. Look up the travel habits of the lemmings.
- b. Look up the life-history of the eel and salmon.
Which ways are they different and which ways are they alike?
- c. Learn the characteristics of mammals:

Example: Many of our tame animals are mammals.

We are mammals ourselves.

All mammals have backbones.

All mammals are warm-blooded, breathe with lungs, have hair, feed their babies milk.

Most mammals have four legs.

Most mammals are born alive.

C. Human Bodies

1. Our Eyes

- a. Bring a camera to school and explain the resemblance of the camera and the human eye.
- b. Report on "How Seeing Eye Dogs are Trained".
- c. Rapid learners may wish to use the encyclopedia and make detailed reports on the parts of the eye and how we see.
- d. Make a study of how an image of an object appears on the retina. Make a pin-hole camera; a pin hole in the bottom of a can, and receive the image on paper (thin). Observe a candle flame through the pin hole camera in a darkened room. How does this show that light travels in a straight line?
- e. Some students may wish to study how the lens of the eye forms an image on the retina. Use a convex lens.

Darken all the windows in a room but one. Have a pupil hold a lens in the window directed at the scene outside. Bring a piece of white paper slowly near the lens until the image picture is formed. What adjustment problem has the eye, as illustrated by this?

II. Non-Living Things

A. Earth and Universe

1. Top Soil and Sub-Soil

- a. Make a study of local soil types (chernozem)

- b. Make a study of lighter colored top soils of other areas. (Example - red top soil of Rocky Mountain states)
- c. Some students might like to look at the classification of soils such as -
Pedalfers - do not collect lime
Pedocals - do collect lime

After a heavy rainfall some pupil may take samples of running muddy water in glass jars and let stand for several hours until sediment has settled.

- d. To show that soil contains air, place some soil in a glass bottle and slowly pour water over it. Observe the air bubbles that rise through the water from the soil.
- e. Along with the study of soil, learning about rocks could challenge rapid learners. Some rocks are rough and gritty and appear to be composed of sand grains cemented together. Sandstone is a good name for such rocks. Another group of rocks appear to be made up of tiny flecks and crystals, something like granite. These rocks may be called granite-like rocks. Other common rocks are slate and limestone and the soft layered shale that often appears along the banks of streams. This simple vocabulary, while not technically complete will serve very well for identifying most of the common rocks. A student so interested might wish to go into the more scientific classification of rocks as to the way in which they

were formed.

- 1) Sedimentary rocks - were formed under water and such common examples are shale and limestone which may be gathered.
- 2) Igneous rocks - were formed by the cooling of molten materials. Lava quartz and mica are good examples.
- 3) Metamorphic rocks - were formed by great pressure and heat from both sedimentary and igneous rocks. Examples of this type are marble from limestone and slate from shale.

2. Time and Seasons

- a. Rapid learners can use a globe as earth and a basketball as the sun and demonstrate the course of the earth in causing the seasons by maintaining the correct slant and watching for the directness of the sun's rays.
- b. The Coca Cola example of the sun-earth-moon set may be used by some students to demonstrate the phases of the moon.
- c. Some students may learn to give time in other places of the world by use of a disk of meridians at the top of the globe.
- d. Write an imaginary story telling what might happen if the sun stopped shining.
- e. Read legends about the sun and relate them to the class.
- f. The film, "Our Mr. Sun" can be secured from the Bell

Telephone Company.

- g. Check shadows on a wall at the same time each day.
- h. Study time charts and seasons of other countries.

3. Water in the Ground

- a. Do a study on methods of purifying water.
- b. Report on our national water supply. How much do we have? What new sources are available?
- c. Report on the water cycle.
- d. Make a study of certain noted caves such as Mammoth Cave.
- e. Make a study of artesian wells.

B. Matter and Energy

1. Making Work Easier

- a. Some students may thread a set of pulleys correctly and determine the ratio of mechanical advantage as versus the measured mechanical advantage by the scale. They can probably reason that the friction loss accounts for the difference and perhaps try to overcome this some by the use of oil.
- b. Some may wish to make a bar scale with a yardstick or also construct models of basic machines.
- c. Some students may wish to collect pictures of early machines and compare them with more modern ones. A girl may like to report on how machines in the kitchen or household have improved.
- d. Do research on how the gasoline engine works. There

are good reference books available in the public library.

2. Some Common Acids

- a. Student may be shown the use of litmus paper to test for acid. Then take different kinds of soil until a highly acid soil is found. The student may then experiment with adding some well pulverized limestone and after a week's time test it again for acid. The student will then see why where there is an abundance of limestone the soil will not be acid in content.
- b. How much gas does baking powder give off? Devise a method of measuring the gas volume given off when a measured amount of baking powder is put into water. You may compare brands in this test.

3. Musical Sounds

- a. After the study of pitch by more and less vibrations per second, some students may be able to make a chart showing the scale in key of C and the vibrations per second for each tone. They would begin with middle C at 256 vibrations per second and progress to the next C at 512 vibrations per second and on up to 1024, etc.
- b. Some students might enjoy a microscopic study of sound recording tape at this point.
- c. Sound Wave Patterns: The number of complete vibrations in one second is the frequency of a particular vibration. With a few drops of hot sealing wax,

attach a piece of fine wire to the prong of a tuning fork. The fork is held rigidly by the handle and placed horizontally just above the table top. Smoke a small pane of glass from the flame of an oil lamp or candle. Now lay the smoked glass pane under the prong with the fine wire which is bent to touch the glass pane. Start the vibrations with the finger and draw the pane along the table fast enough so that a wavy line is visible on the pane. Repeat the same experiment, drawing the pane away at different speeds and using different tuning forks. The higher the top of the wave from the base line the louder the sound.

4. Make a record player or phonograph.

Materials needed: 2 circular pieces of wood about 2.5 cm thick and 30 cm in diameter.

baseboard 80 x 40 x 2.5 cm

thick tube of duco cement

phonograph needles and some pins

metal flange as frame of reproducer

adaptor for the needle

Directions for construction: Mount the two circular pieces of wood on the baseboard with the drive wheel and turntable connected by a suitable length of heavy cotton cord. The flannel or felt pad is glued to the turn-table as the base for the record. The important part of the machine (the reproducer and horn) may be

made by using a paper milk container. Cement a rubber band neatly around the edge of the metal flange upon which the cap normally rests. Cut out a disk of mica sheet the proper size to fit the milk container opening. Drill a small hole at the center and after bending an oversize pin sharply near the head, insert it into the hole in the metal flange. Cement the diaphragm in place with Duco or quick-drying cement. For the adaptor, cut a length of 6 mm of small brass rod, drill a small hole all the way through and solder it to the cut off end of the pin. Secure a set screw and drill a hole in the side of it a bit smaller than the threaded part of the screw and then force the screw in by turning it firmly so that it is well secured. Instead of making the adaptor you can use a brass electric wire fixture from any old lamp socket as the adaptor. For the horn remove the bottom of a wax paper ice-cream cup or a paper milk container and fix it in the hole of the metal flange. Attach the whole unit to the carrier arm with adhesive tape and the rest will be up to you.

5. Electromagnets

- a. Make an electric switch and a telegraphic sounder.
- b. Make a single phase electric motor from a pencil.
- c. By double drilling the pencil a double phase (self-starting) electric motor can be made from a pencil.
- d. Encyclopedias have excellent material on the modern uses of the electromagnets.

6. How Airplanes Fly

a. Suggested topics for use of the encyclopedia might be:

How Airplanes Fly

Early Airplane Flights

Specific Distance Flights

b. The Airplane

- 1) The aileron can bank the airplane to one side or the other, and then make it fly level again.

Make a model airplane out of thin cardboard. Slit the back of each wing in such a way that you can bend a piece of the wing up and down as an aileron.

(Use suggestions in text) Fasten a thread to the nose of the model. Pull the model straight up, slowly. Now bend one aileron up and the other down. Pull the model up slowly again. Reverse the position of the ailerons and repeat the procedure. The student should now explain the use of ailerons.

- 2) The rudder of an airplane makes the plane turn to the right or to the left. Use the model plane again. Find the balancing point of the model. Push a pin through this point and stand on a cork in a bottle which serves as a stand. Use a milk straw and blow to produce a wind tunnel effect and by setting the rudder in different positions we may learn its use in flight.

- 3) Use the same procedure with the elevator fins of the tail assembly.
- 4) To make a wind tunnel to supply a steady stream of air we could use nine milk cartons with both ends cut out. These could be stacked in a cube arrangement with all the open ends the same direction. An electric fan could be placed before these after they are tied together and weighted down. This will produce a wind tunnel effect for the above mentioned study.

c. Thrust of an airplane propeller.

Materials needed: Top of tin can or metal disk, (this could be the bottom of an aluminum pie dish.) wooden dowel, tin snips, large nail, 2 small nails, metal file, spool, cord, ruler. Cut the propeller from a light weight metal disk. Find the center of the disk and cut as shown.

To cut the rotary, thrust the nail through the spool and drive the nail into the dowel. Keep the spool free to spin. Now remove the heads from the two small nails. Set the small nails into the top of the spool. Make certain they are directly opposite each other. Punch two small holes in the center of the propeller so that it will fit loosely over the two nails. Bend each blade of the propeller in the same direction. Wind a few feet of string on the spool

and pull the string. As pressure of air builds up under the propeller it will rise as it spins. This greater air pressure from behind a propeller causes it to bring a plane forward.

7. Air in motion.

- a. Give a report on the pressure cooker and why it is effective.
- b. Report on tornadoes as to the cause the safest place to be if a tornado approaches.
- c. Students can make and maintain a weather station.
- d. Making a "Mason jar Barometer".

Materials needed: Mason jar, piece of rubber from a toy balloon, glue, string, a straw.

Procedure: Cover the mouth of the mason jar with the piece of rubber. Tie the rubber down with string.

Glue a straw to the rubber surface. Make a cardboard air pressure scale. Align the straw so it serves as a pointer on the scale.

Results: The homemade barometer seems to react to changes in air pressure. When the air pressure increases, there is increased pressure on the upper surface of the rubber. This causes the rubber to move down in the center. At the same time, the straw or pointer moves up. When the air pressure decreases, there is less pressure on the upper surface of the rubber. The rubber then moves up. This causes the

the straw to move down.

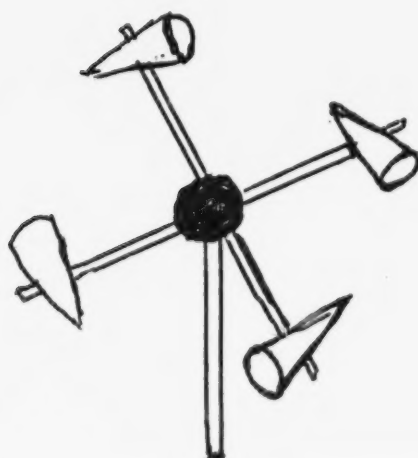
Explanation: A barometer measures air pressure.

Barometric readings are used in predicting the weather.

This homemade barometer should be compared with a commercially made barometer. Reading from each type should be compared. Encourage the children to try to standardize their homemade barometer by setting a scale in accordance with the commercially made barometer.

8. Anemometer (paper cup type)

An instrument that measures wind speed or velocity.



Calibrate by counting the number of times per minute this instrument revolves in a 5 minute period with comparison with known wind speed periods and set a scale after such a formula is worked out.

A medicine dropper glass bearing may be devised and secured to the thin wood sticks with tape.

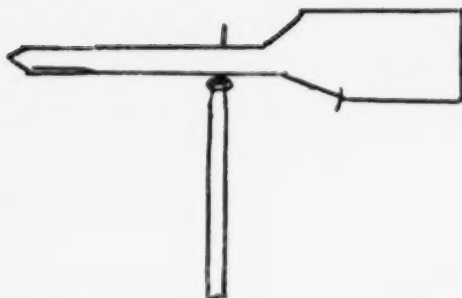
9. Rain Gauge.

A simple rain gauge made by use of a gallon can for collecting the rain and a smaller one for a measuring scale will work out very well. Pour water into the gallon can until it reaches a measured depth of one inch. Transfer this to

a small can and divide the inch level into ten equal divisions. Each division will be equal to a tenth of an inch of rain falling in the area of the larger can.

10. Wind vane.

A wind vane points to the direction from which the wind is blowing. A simple wind vane with an arrow made of plywood can be balanced with a nail or pin into a vertical piece of wood. The hole must be larger than the pin so that it turns freely.



A couple of washers (metal) may be used to produce a smooth bearing surface and hence greater freedom of swing with the change in wind direction.

11. Toy Submarine (Air may be used to control buoyancy.)

Material needed: Large glass jar or aquarium jar (small), small glass jar, rubber sheeting from balloon or inner tube.

Procedure: Fill the large jar nearly full with water. Put some water in the olive jar, then place it upside down in the large jar of water. If the olive jar has the right amount of water in it, it will float. Keep filling or emptying the olive jar until it is able to float, with its topside down. Now stretch the rubber sheeting over the mouth of the large jar. Press the palm of your hand over the rubber cap. Observe what happens. The submarine

(olive jar) dives or sinks when you press the rubber cap. The palm of your hand pressing on the rubber cap produces enough pressure to compress the air inside the olive jar. With the air compressed, additional water flows into the olive jar. The additional water flows into the olive jar and makes it heavier than the water that it displaces. Thus it sinks. When your hand is removed, the air expands and pushes the excess water out of the olive jar. The jar rises and floats again.

12. Air can replace water (Building a model Caisson)

Material needed: Some plasticine, large plastic funnel, rubber tubing, glass container.

Procedure: Model a man out of plasticine. Lower him into the glass container which has been filled with water. Place the funnel over him. Connect the rubber tubing to the funnel. Then blow into the end of the rubber tubing.

Observations: Bubbles form at the surface of the water. Water is being forced out of the funnel. The air blown into the funnel forces the water out and actually replaces it. This area remains void of water as long as the air is blown into it.

Problem: Have the children make a study of the way the caisson has been used by man. Study the way tunnels have been constructed under water.

Materials were taken from Science Today for Elementary

School Teachers by Navarra and Zaffaroni.

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S O C I A L S T U D I E S

Social Studies offer a particularly rich area of experience for the bright pupils. Children have a natural curiosity about their environment which is an important motivating influence.

The academically talented is capable of, and should be guided toward, producing work on a consistently high level. The great wealth of reference materials plus the world itself as an observational laboratory indicates that accommodation of the gifted in the area of Social Studies can be implemented with great effectiveness.

S O C I A L S T U D I E S

Kindergarten

A. The Home

1. Plan a chart to show tasks a child can do to make a "happy home".
2. Make booklet showing family fun.
3. Make a booklet showing family work.
4. Construct useful and decorative objects for family use: cardboard box penny banks, bulletin board to use at home, games, date books, holiday place mats, etc.
5. Make scrapbooks of pets, members of family.

B. The School

1. Lead discussions on proper behavior in school room, lavatory, halls, playground.
2. Bring and share personal belongings to enrich group study: eg - scrapbooks, encyclopedias, books, travel souvenirs, etc.
3. Help plan parties and social events in classroom.
4. Accept responsibility for assisting a new pupil to make school adjustments.
5. Make a guest book that persons who visit the classroom can sign.
6. Construct model rooms showing furniture arrangement, color schemes, etc.

C. Community

1. Make scrapbook showing uniform or apparel of various community workers.

2. Tell about a favorite neighborhood grocery store. Construct a play store like it from a large box.
3. Extend personal contacts with individuals to obtain information about community workers and relay to class.
4. Help with bulletin board on community helpers.
5. Make puppets of policemen, firemen.

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S O C I A L S T U D I E S

Grade 1

A. The School

1. Learn more about school helpers and report to class.
2. Dramatize or pantomime good manners.
 - a. In the schoolroom
 - b. In the halls
 - c. In the lunchroom
3. Make puppet theatre of mattress box.
4. Make puppets:
 - a. School helpers
 - b. Dolls dressed for various types of weather.
5. Set up lost and found department
6. Set up a library corner -
 - a. Show others how to handle books.
7. Write thank you letters for class (after trips or special treats).
8. Make murals and scrapbooks.
9. Help with bulletin boards on - safety, manners, sharing, patriotism.
10. Make posters to show cleanliness -
 - a. School yards - trash cans
 - b. Building - use waste basket
11. Make pipe cleaner children illustrating desirable and undesirable behavior.

B. The Home

1. Arrange displays made by children's drawings of family activities.
2. Be responsible for collecting and arranging pictures of homes and families in scrapbook.
3. Pantomime or dramatize -
 - a. Family working or playing together
 - b. Children doing chores at home
 - c. Children playing with younger ones at home.
 - d. Children going on errands.
 - e. Good manners at home.
 - f. Safety in crossing streets.
 - g. Safety in playing.
4. Make puppets of a family.
5. Bring outside books on homes and families to share with class.

C. Community

1. Collect pictures for bulletin board or scrapbook of community helpers.
2. Gather information on postoffices, grocery stores, hospitals, and share with class.
3. Illustrate good behavior in public places.
4. Make puppets of community helpers.
5. Set up grocery store in classroom.
6. Find books on community helpers to show class.
7. Make up riddles "Who am I thinking about" for community helpers.
8. Find out about food, where it comes from and report to class.

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S O C I A L S T U D I E S

Grade 2

A. Food

1. How are different foods brought to Grand Forks.
2. Discuss different foods for daily meals.
3. Make booklets, posters, a floor plan to represent the super-market.
4. Model and paint fruits and vegetables.
5. Make a frieze for scenes as:
 - a. A man milking a cow or using a milking machine.
 - b. A worker putting cans of milk in a cooking room.
 - c. A truck taking milk to town.
 - d. Workers getting milk ready to be bottled.
 - e. Machines filling bottles with milk and capping them.
 - f. Milkmen delivering milk.

B. Community Helpers

1. Construct a miniature town. The first part of this will be built around the children's immediate neighborhood. A map of the town, county or state from the Bureau of Records or Chamber of Commerce will help motivate the unit.
2. Make up short riddles about one of the buildings in Grand Forks and have the other children guess what building it is.

Example:

I keep my money here - it is safe here. What is it?

(bank)

I read stories here - I can see magazines, too.

What is it? (Library)

3. Make a movie showing how policemen help us. They may show their movie on the play television screen.
4. To encourage the children to use book marks, suggest that each child make and design a bookmark of his own.
5. Make a puppet of a character from their favorite library book.
6. Print the children's names and addresses on signs - then arrange these signs attractively on the bulletin board. The display would be labeled - "Know Where You Live".
7. The rapid learners may set up a play post office and demonstrate the different kinds of work that must be carried on so that letters and packages will reach their destinations. The following activities can be demonstrated in the play post office:
 - a. Sorting mail into bags.
 - b. Cancelling stamps on letters.
 - c. Selling stamps.
 - d. Weighing packages.

May paint pictures showing different ways in which mail is carried from place to place.

C. Miscellaneous

1. School

- a. Important happenings - Materials: drawing paper, crayons, pencils.

b. Keep record of important happenings -

1) For the entire class

2) For individuals - such as speakers, movies, programs,
etc.

c. Bulletin Boards. First unit on boats. Have pictures of
different boats. Write a short story telling something
about each boat pictured.

2. Away for a visit.

a. Pupil chooses a place especially interesting to them and
finds pictures and materials on it. Materials can be sent
for. Letters written, etc.

b. Pupils can find materials on how they would go to a place
of their choice. Make a booklet.

3. More About the Neighborhood.

a. Know your city - more able children may take arrangements
for speaking.

b. How did these receive their names?

1) River

2) City parks

3) City schools

4) University

5) Hospitals

c. Make maps of local area.

d. New projects of city

1) New bridge

2) Airport

3) Comparison of old and new bridge

4. Summer Vacation Trip

- a. A report on own vacation trip can be given. Pictures collected - this is usually done for entire group.

5. Other Activities

- a. Shows - shoeboxes can be used.
- b. Murals
- c. Puppets

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S O C I A L S T U D I E S

Grade 3

A. Food

1. How has science aided farmers in giving us more, better and a greater variety of foods than people had long ago?
2. Where do our grocery stores get tomatoes, cucumbers and other out-of-season vegetables in the winter?
3. Make meal by grinding corn or wheat between two flat stones as the Indians did.
4. Dry some fruits and vegetables as the Indians did.
5. Arrange an exhibit or make a chart of foods made of different grains.
6. Make a large picture map of the United States showing where we get certain foods such as fruits, grains, cattle, vegetables etc.
7. Make a collection of seeds.
8. Make a poster on vegetables.
9. Secure information on care of a garden.
10. Make a list of products made from milk.
11. Construct poster of different kinds of apples.
12. Make drawings of vegetables from truck farms.

B. Clothing

1. How are furs obtained and made ready for use as clothing?
2. Find out how leather is processed.
3. Find out how early people provided themselves with clothing.

4. Write an exchange letter to a school in the south, requesting cotton bolls to be used in an exhibit.
5. Write to the Department of Entomology, Washington, D.C., for silkworm eggs.
6. Make dyes from plant sources - onion skin, beets, spinach, walnuts.
7. Make button collection cards to hold different types - wooden, cloth, metal, plastic, etc.
8. Make a display or booklet of as many synthetic materials as possible. Find out from what materials they are made.
9. Make a chart of pictures of the animals which give us fur - telling something interesting about each animal.
10. Learn how suits and coats were made before textile mills.

C. Shelter

1. Collect pictures from magazines of all kinds of homes in nearby and distant lands.
2. Discuss probable reasons for the various kinds of materials used in buildings and also the style of construction.
3. Watch a building under construction and notice the steps in its development making note of: The materials used, the kinds of work done, the sources from which the materials came and the provisions for light, heat and water and sewage disposal.
4. Make a large map of the school area. Locate the children's homes.
5. Build a model barn.

6. Picture scrapbook of grandparents home land.

D. Community Helpers

1. Make a large wall chart of the services a city provides for its people. List under each service the workers who do the job.
2. List of rules for a good community helper.
3. Learn duties of dairy farmers.
4. Read stories of different communities.
5. Find out what is done in case of a forest fire.
6. Tell how the Community Chest helps the community.
7. Hear a talk on "What makes a city".
8. Build a clay tractor.
9. Learn songs of the South that tell of worker's hardships, activities and pleasures.
10. List and pictures of machinery and tools used by the farmer.

E. Miscellaneous

1. Make a large jig-saw puzzle of the U.S. on bristol board and cut apart the states so that they can be fitted into the outside frame.
2. Make a puzzle map of the world cutting out the continents.
3. Make reports on Indian myths.
4. Make a chart of Indian signs and what they mean.
5. Make a scrapbook of baby animals.
6. Soap carving of a buffalo.
7. Bulletin board of birds and zoo and farm animals.
8. Plan an imaginary visit to Yellowstone Park.

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The Great Plains

The Midwest

The Northeast

The South

The West

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Boats, Bridges, Trucks

Stones, Cotton, Electricity

Heath, Our Country.

Scott Foresman, In City, Town and Country.

Silver Burdett, Ways of Our Land.

Singer, I Know People.

Winston, Our Neighbors at Home.

S O C I A L S T U D I E S

Grade 4

A. Maps, Models and Drawings

1. On an outline map of Europe find where the explorers came from or for which countries they did the exploring. Label countries and use a color to designate each explorer.
2. On an outline map of the United States show what regions were explored by various persons.
3. Find an interesting paragraph in the chapter in your textbook that you have read. Draw a picture to show what it tells.
4. Collect pictures or make drawings of ships used long ago and of those used today. Make a chart out of the collection.
5. Compare homes, clothing, tools and occupations of early settlers and people today. Try to find pictures to show differences.
6. Make a cloth chart. Collect samples of different kinds of materials used at the present time - cotton, silk, linen, rayon, nylon and dacron. Label samples.
7. Collect pictures of different kinds of homes. Make a chart and label.
8. Trace the route of raw materials to the finished products. Make a chart showing raw products and finished products.
9. Draw a series of pictures to show how trees are cut and made into boards.
10. Collect pictures of forest products. Mount and label.

11. Tell how wheat is grown and harvested. Try to find pictures of machines used to plant and harvest wheat.
12. Draw a group of pictures to show some important things that happened in Washington's life.
13. On a sand table show a portion of a desert and an oasis.
14. People very early depended upon stars as a guide when traveling. Make a drawing to illustrate.
15. Make a model of an early home. You will want to use dried grass for the roof.
16. Watch the newspapers and collect pictures of places studied about. These can make a scrapbook.
17. Make a study of modern farm machinery. Include drawings, pictures, reports, etc.
18. Obtain a road map of your state. List the names of the large cities and the highways.
19. Using the state map, decide what highways would be traveled when going from Grand Forks to numerous places.
20. Make a chart or booklet of information about our state bird, flower, tree and flag.

B. Creative Writing

1. The pupil may write about an imaginary exploration - "The Place I Would Most Like to Explore". Such questions may be a good starting point:
 - a. Why did you pick this place?
 - b. How would you get there?
 - c. What would you find there?

- d. What would you do?
2. You be an inventor. What machine would you like to invent?
What would it do? Illustrations may accompany this project.
 3. Write a story giving reasons why Abraham Lincoln has been admired by the American people.
 4. After reading about Luther Burbank what are some of your ideas about improving plants? Write a few paragraphs telling what plants you would like to improve. Tell how you think it could be done.
 5. Imagine you were with one of the pioneer families. Describe some of the difficulties in getting a home built, obtaining food, etc.
 6. Pretend that you are one of the "Forty-Niners". Tell how you would go to California and what your life there would be like.
 7. Think of some good reasons why John Smith was a good leader. Write some ways in which you could be a good leader in school.
 8. Write some paragraphs and explain why some cities have grown to be so large.
 9. Suppose you had gone on a boat trip around the Mediterranean Sea. Write a letter to someone at home telling what you were seeing and doing.

C. Puzzles and Games

1. Make riddles over things being reviewed.
2. Make up questions about plantations - quiz others.
3. Write some riddles about things seen in or near New York,

New Orleans, Seattle or Phoenix. Use some new words which you have learned in your study.

4. Write short riddles about Columbus, Magellan, Cabot, Cartier, Champlain and Hudwon. Read them to the class and have other members guess who they are.
5. Present a TV program. Someone describe cities studied about and let the others try to guess what is being described. This could also be used with explorers and other famous people.

D. Reports

1. Write a report on "Where the Early Settlers Received Their Materials for Clothing".
2. Write a report on "Where the Early Settlers obtained Their Materials and Furnishings for Homes".
3. From what is nylon made and how does it differ from other yarns? When and how was it discovered?
4. Materials used in building present-day homes.
5. Make a list of all the things you can think of which are made from corn. Make another list of things made from wheat.
6. Report to the class on additional information regarding Cyrus Field and Eli Whitney.
7. List the things that Benjamin Franklin did or invented.
8. Report on how the Red Cross helps people.
9. Make a list of tools and equipment used on the farm today.

E. Readings

1. Read the story of Hans Brinker and the Silver Skates.
2. Read for further information on some of the early explorers.

3. Read about Stephen Foster's life. Make a list of his songs and decide which ones you like best.
4. Read a story about prospectors in the rush for gold in California.

F. Interviews

1. Interview someone who has hunted or trapped animals; then report back to the class.
2. Interview a member of the Chamber of Commerce to obtain information about our city.

G. Local Research

1. Make a study of why Fargo grew to be the largest city in our state.
2. What cities in your state are growing as a result of a new industry?
3. How has Grand Forks been affected by the building of the Air Base?
4. What other city in North Dakota has an air base located near it? How does that city compare in size with our city?
5. What do highways do for our state?
6. Where is road building going on in North Dakota?

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Cross-Country - Scott, Foresman

S O C I A L S T U D I E S

Grade 5

A. Reading - Books, Magazines, Poems

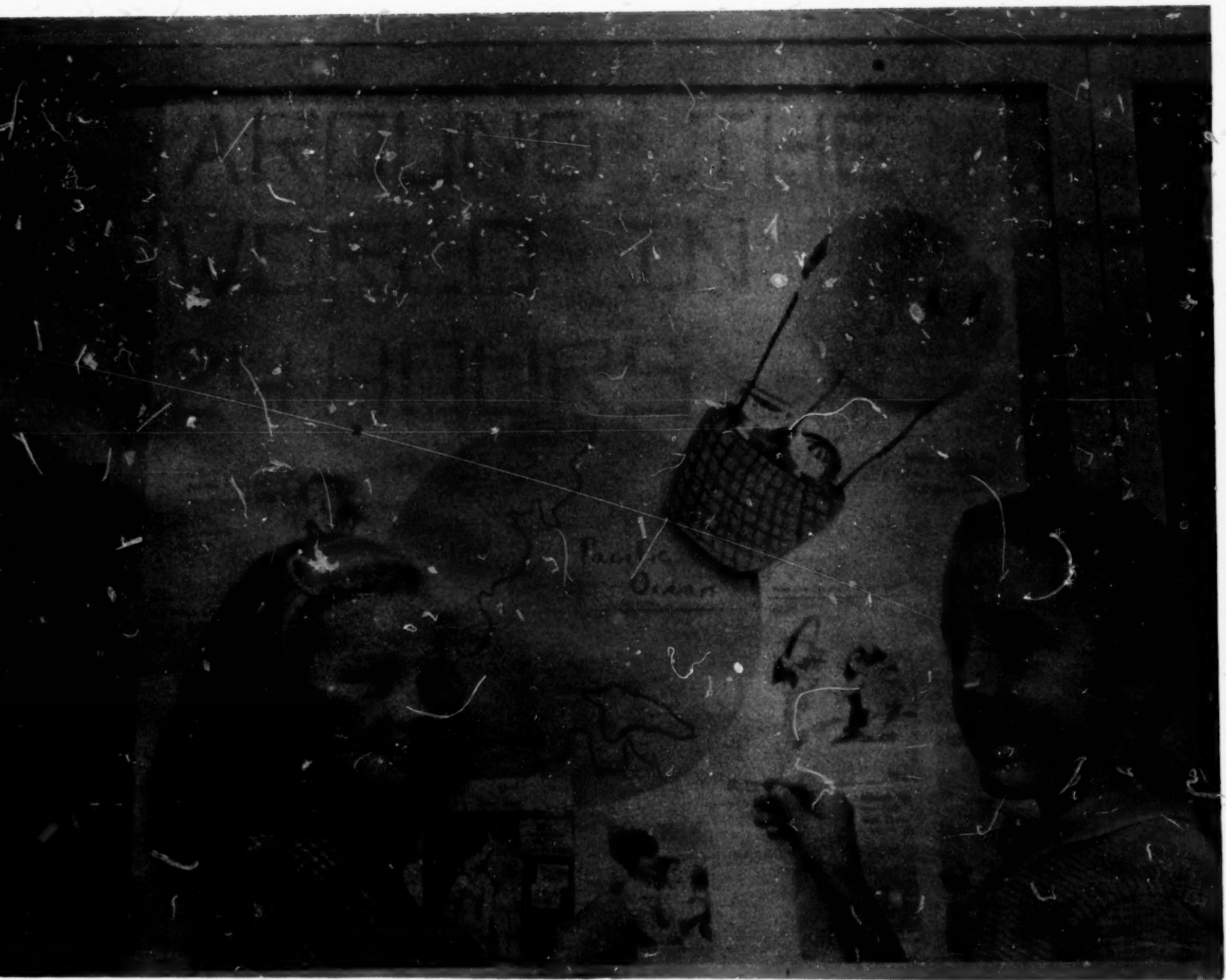
1. Reading at an advanced level on the classroom topic of interest.
2. Locate source materials for class use.
3. Use the encyclopedias to find information about these people who were famous in the history of the eastern United States -
 - a. Sir Walter Raleigh
 - b. James Oglethorpe
 - c. Pocahontas
 - d. John Smith
4. Use the tables in the index of your book to find the following -
 - a. The five states having the largest population.
 - b. The five largest states in area.
 - c. The five largest cities in the United States.
 - d. The nickname of your state and those states which border your state.

B. Maps and Models

1. Make political, relief and product maps. Make a product map for Alaska and Hawaii.
2. Make a large map of Central America. Locate important places mentioned in your book.
3. Draw a map showing where these minerals are found. Tell how mined, how refined and tell uses: baurite, salt sulphur, steel, petroleum.
4. Collect samples of different kinds of maps for an exhibit. Label maps (kind) and how they are used. Include political,

- relief, highway, population, rainfall, temperature, products, natural resources and others. Tell why they are different.
5. Draw a map showing how large the United States was at the end of the Revolutionary War. When Washington became president.
 6. Find a list of nations that are United Nations members. On an outline map of the world, color countries which are members of the United Nations.
 7. On a United States map draw the entire route of a particular U.S. highway near you such as - 81, 2, 75.
 8. Make a pictorial map suggested by reading:
 - a. Paul Revere's Ride
 - b. Star Spangled Banner
 - c. Lewis and Clark Expedition
 - d. Gold Rush
 - e. Revolutionary War
 9. Draw a map of South America.
 - a. Show countries.
 - b. Show products (pictured).
 - c. Imports & Exports (in margin)
 10. Make an illustrated map of Lewis and Clark journey. Show Missouri River, Columbia River, Snake River and Rocky Mountains. Along the route draw a picture showing the kind of transportation the explorers used. Why did the Lewis and Clark party use so many kinds of transportation?
 11. Pictorial Map - little pictures to mark important places and events.

SOCIAL STUDIES



- a. Civil War
 - b. Rold Rush, etc.
12. Plan a vacation trip to some part of the United States.
- a. On an outline or road map draw route.
 - b. Make a guide book about places you visit.
13. Set up models of castles, homes, war-implements of various periods.

C. Drawings - Pictures, Murals, Cartoons, Scrapbooks, Charts, Booklets.

- 1. Making a mural based on research.
- 2. Making a scrapbook or assembling pictures to accompany unit of work.
- 3. Tracing the source and course of the major rivers of the world.
- 4. Making slides and transparencies.
- 5. Make a scrapbook about great men who helped us gain our freedom. Write a story about each one. Here are some men you might include: George Washington, Samuel Adams, George Rogers Clark, Benjamin Franklin, John Hancock, Thomas Jefferson, John Paul Jones, Lafayette and James Madison.
- 6. On an outline map, color the Union States, the Border States and the Confederate States.
- 7. Read about some of the important battles of the Civil War. Make a scrapbook, using one page to tell about each of these battles, include reasons for the outcome of the battles.
- 8. Plan a vacation trip through New England. On an outline map or a road map of this section draw the route. Make a guide

book about the places you will visit.

9. Make a transportation chart similar to the following and fill in the necessary information.

Form of Transportation	Who Used	Miles per hr.	Remarks: Comfort, Invented by, etc.
Walking			
Horseback			
Covered Wagon			
Sail Ships			
Clipper Ships			
Steam Ships			
Trains			
Bicycles			
Airplanes			
Jets			

10. Look up "asbestos" in the encyclopedia. Make a report on what you find. Prepare a chart of articles made from abestos.
11. Draw some pictures of some of the interesting things you saw on your trip through Canada, Mexico and Central America. Arrange them on a bulletin board. Label each one.
12. Did you ever make a diorama? Take a large box with a lid, remove one side and cover the opening with cellophane. Inside the box make a scene of some interesting thing you have read about in this unit. Ask your art teacher to help you with this project. Invite your parents and friends to come to see them when they are finished.

13. Murals and Friezes

- a. Diorama - Gold Mining Boom Town
- b. Different ways of traveling west -
 - 1) Prairie Wagon
 - 2) Stage coach (date for each)
 - 3) Railroad
- c. Life on the Last Frontier
- d. Mississippi flatboat going down the river
- e. Adventures of Lewis and Clark expedition
- f. Buffalo Bill
- g. Caravan of Covered Wagons
- h. Diorama - Stagecoach Leaving Deadwood
- i. Plantation life in the South
- j. Interesting events in Lincoln's life
- k. Diorama - Driving the Golden Spike
- l. Forms of communication
- m. Forms of transportation
- n. Declaration of Independence

14. Great men who helped us gain our freedom

- a. Write a story about each
- b. Illustrate with pictures and drawings -
 - George Washington, Samuel Adams, George Rogers, Clark,
 - Benjamin Franklin, John Hancock, Thomas Jefferson,
 - John P. Jones, Lafayette, James Madison

15. Posters

U. S. A. - land of many people (important persons not born here) -

<u>Name</u>	<u>Reasons for importance</u>	<u>Country of birth</u>
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Famous U.S. women

<u>Name</u>	<u>Reasons for importance</u>
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16. Time line - Make it 20 inches long. Let each inch equal 10 years. Place a mark across the line at each date -

1776 _____ 1961

Important invention in U. S.

Territorial growth to now

17. Making a scrapbook -

New England

The West

Early days

Early days

Now

Now

18. Bar graph - Immigration.

Use World Almanac to get figures for various years from other countries.

D. Reports & Discussion

1. Constructing a history or geography word file and placing words under such headings as - People, Places and Events.
2. Make a time line.
3. Prepare biographies of great men.
4. Report why Stephen Austin, Sam Houston and Davy Crockett are important figures in the history of Texas.
5. List the reasons New York has become the largest city in the

nation.

6. Report on the importance of water - rivers, lakes and oceans - to the welfare of great cities.
7. Learn of the many ways we use corn and wheat in our homes.
8. Report on one or more of the following -
 - Great Smokey Mountains National Park
 - Jamestown
 - Williamsburg
 - Peanuts
9. When Washington was a boy, he copied into his notebook some rules to live by. List ten rules to live by which you think will help you become good citizens.
10. Make a list of things nations can do to prevent wars.
11. Report on one of the following -
 - The Alaska Highway
 - How the Eskimos live
 - The Virgin Islands
12. Compare the climate of Anchorage with that of Grand Forks.
13. Explain why the population of Canada is so much less than the United States.
14. Find out why people in Brazil speak Portuguese instead of Spanish.
15. Compare the climate and natural resources of the United States and Argentina.
16. In your opinion, what was the most important thing Bolivar did for the people of South America? Give reasons for your

answer.

17. In the low latitudes the crops that are grown often depend upon the altitude of the land. Explain why this is so.
18. How is the gathering of latex from rubber trees similar to gathering pine gum in the forests of our Southeastern states?
19. What are some problems that are common to many South American countries? Which countries are doing the most to solve these problems?
20. Report on the lives of -

DeWitt Clinton	George W. Carver	Davy Crockett
Thomas Jefferson	Stephen Foster	Sam Houston
Patrick Henry	Wright Brothers	Jane Adams
Samuel Adams	Johnny Appleseed	Stephen Austin
Clara Barton	Harriet B. Stowe	Thomas Edison
Robert E. Lee	Daniel Webster	Elias Howe
21. Compile a list of products now obtained from petroleum, coal, rubber and tin.
22. Panel discussion - What duties do you have as citizens?
23. Make a history dictionary - Who's Who and What in American History. Illustrate when you can.
24. We are always in need of good leaders. What can you do to become a good leader?
25. How will your education help you to become a better citizen? (panel)
26. Name three ideas in the Declaration of Independence that were new and exciting to most people in 1776. Why do you

think these ideas are still important to us today?

27. Describe a day on the Oregon Trail.
28. How have automobiles changed our ways of living in the following:
 - Vacations
 - Movies
 - Shopping centers
29. How do people work together in your community? Name organizations.
30. There are still many things to be discovered that are just as exciting as the discoveries you have been reading about. What would you like to discover?

E. Plays and Dramatizations

1. Dramatizing historical events.
2. Plan dramatizations of these two incidents:
 - "Remember the Alamo!"
 - "The Oklahoma Land Rush"
3. Play a travel game about places you visited in this unit. Make up statements such as: I am a Canadian Province located straight north of North Dakota and Minnesota. Who am I?
4. Pantomiming
 - a. Meeting of Lewis & Clark and Mandan Indians
 - b. Meeting of Sacajawea and her chieftain brother
 - c. Explorers viewing the Pacific
 - d. One of experiences of expedition on journey

5. Dramatizations of historical incidents

- a. A boy in early Boston gets a new pair of shoes
- b. Peter Stuyvesant gets a letter from the British
- c. First steamboat to sail up the Hudson
- d. Erie Canal is opened
- e. Incidents in Daniel Boone's life
- f. Fur trading between white men and Indians

6. Fashion Show

- a. Civil War era
- b. Gay Nineties
- c. Way a family dressed to go riding in early automobiles

7. With classmates dramatize the government's action in buying Alaska in 1867. (How did the news affect most Americans at that time?)

F. Creative Writing and Talking

- 1. Describing an imaginary visit to a foreign land or a trip around the world.
- 2. Participating in a seminar on critical issues and probing for reasons.
- 3. Imagine that you are a soldier at Valley Forge. Write a letter to your family describing the winter there.
- 4. Imagine that you are an article manufactured in New England. Write the story of your life from raw material to finished product.
- 5. Pretend that you are visiting a sugar plantation of Hawaii or Puerto Rico. Write a letter to a friend telling him how

the cane is raised and processed.

6. Write adventure stories.

- a. Pony Express rider
- b. Stagecoach driver
- c. Transcontinental railroad builder
- d. Smoke jumper

7. Creative writing

- a. Down in a coal mine
- b. A day at Atlantic City
- c. Sight to see in the Blue Grass Country
- d. Yankee Clippers
- e. Muscle Shoals
- f. Erie Canal
- g. A trip by water around Manhattan Island

8. Imagine you are spending the summer on a cotton plantation.

Make a diary telling interesting things you do.

9. Imagine you own a fruit ranch in California's Central Valley.

Write a letter to a friend telling about crops and work you must do.

G. Display - Exhibits, Collections

- 1. Planning current events bulletin boards.
- 2. Arranging a program of music, art and literature to demonstrate the contributions of other nations and cultures to civilization.
- 3. Collect pictures of different kinds of machinery used on wheat and corn belt farms. Label each machine.

4. Make a collection of Washington, D.C. pictures for your room.
Some of these can be secured from railroad and bus companies.
Have a member of the class write for them.
5. Newspapers and magazines contain articles about South America.
Make a collection of these and arrange them on a bulletin board under the names of the various countries.
6. Products - exhibits
 - a. Exhibit of the South. Include these textiles: cotton, rayon, nylon, wool.
 - b. Pictures
 - c. Articles
 - d. Advertisements
7. Collection of early songs. Learn to sing them and dance-games.
Old Zip Coon, Quilting Party, Pop Goes The Weasel.
8. Charts of various early inventions showing: Machine - Date - Inventor

H. Field Trips

1. Make a field trip to a museum, the court, or an industry and report to the class.

I. Puzzles and Games

1. Make tests, puzzles and quizzes.
2. Riddles - Name three things about each of the following:
Historical characters, geographical regions, products.
3. Games - Crisscross. Similar to spell-down as review - place geography or social studies as subject matter.

J. Local Research

1. Assist others in the use of references such as globes, maps and encyclopedias.
2. Study independently on such topics as one's own family history or lives of local pioneers.
3. Debate current controversial issues.
4. Study local political organizations.
5. Think critically about current issues.
6. Participate in activities which require dealing with others diplomatically.
7. When the United States bought the Louisiana Territory in 1803, we paid less than 4¢ an acre. How much does an acre of land cost in the Red River Valley? At that price, how many acres could you buy with the 15 million we paid for the Louisiana Territory?
8. Write to the National Park Service, Department of Interior, Washington, D.C. to secure booklets on Blue Ridge Parkway, Whenandoe National Park and Jamestown.
9. Using examples from this unit to illustrate your points, show how the surroundings in which people live help them to decide what to do for a living.
10. Research reading
 - a. Reports - include the following:
 - free materials sent for
 - bulletin board
 - contrasts or comparisons

making posters, cartoons, graphs, charts, maps,
anecdotes about well-known persons

b. Subject

Death Valley	How plywood is made
West Point	Canals - roads made of water
Grand Coulee	Whaling - who? where? how?
Mardi Gras, New Orleans	How oil is used
First factories	Railroads - then and now
Mormons	TVA
Alaska Highway	Dry farming in the West
How Eskimos Live	How British captured Washington, D.C.
Virgin Islands	Missions in California
Sheep raising	Writing the Star Spangled Banner
How land is irrigated	Pioneers and unfriendly Indians
Life of a cowboy	

11. Local inquiry

- a. North Dakota and Oregon have statues of Sacajawea and her baby. Where is our state's statue?
- b. What is the oldest newspaper in your locality? What is the earliest presidential inauguration it could have carried? What were the earliest events of national importance that our paper could have covered?
- c. Try to find a picture of a sod hut. (Local early residents) Why were sod houses used instead of log cabins?
- d. Indian reservations in state? Name, where located, number of Indians. How did these Indians make a living before

moving to reservation?

- e. Where is there a public recreation center near your home? Make a list of activities for boys and girls in your community.
- f. Make a collection of pictures showing pioneer scenes. Make a bulletin board display with a title for each.
- g. Interview the postmaster to find the different services the Post Office gives to people in community.
- h. Visit the following places to determine how machines are used in each:

factory	bank
dairy	fire department
telephone exchange	newspaper office
TV station	store
office	airport
- i. Make an industry map of North Dakota. Outline boundaries, show industries accurately. Draw and paste pictures.
- j. Farming in the United States. Compare the kinds of farming carried on in a certain United States region with farming as carried on where you live.
- k. Write your County Agent asking him to come to school to tell about work of 4-H Clubs.
- l. What is some of the work of our city or county Board of Health to keep our community healthful and sanitary?
- m. Make an exhibit of products of North Dakota. May be combined with i.
- n. Make a picture collection of machinery used on corn and wheat belt farms. Label each machine.

- o. Collect stories, books or pictures of early days in your town. Get help from librarian or early settler in community.
- p. What is done to keep our parks beautiful?
- q. Make a list of ways that land near our home and land in the Middle Atlantic States is alike and different.
- r. Have someone who has visited New Orleans invited to visit your class to tell about it. (Any city)
- s. Visit the public library. Learn how books are arranged and located.
- t. Find out how our community gets its drinking water.

12. Write for materials to:

National Park Service, Department of Interior, Washington,
25, D. C.

Books and pamphlets about: Blue Ridge, Shenandoah,
Smokey Mountains, Jamestown,
Crater Lake National Park,
Mt. Whitney, Mt. Rainier
National Park.

Railroad and bus companies asking for pictures about
Washington, D. C. for a collection for your room.

13. Exercises - Section of country.

Alphabet story - A - Akron - tires

B - Boone - brave pioneer

C - corn - important crop, etc.

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Lenski, Lois, Prairie School.

Mathiews, Franklin K., editor, Boy Scouts Yearbook of Patriots
and Pioneers.

McMeekin, Isabella, Journey Cake.

Melrose, Mary, Natures Bank, the Soil.

Melrose, Mary, Raindrops and Muddy Rivers.

O'Donnell, Mabel, Singing Wheels.

Quinn, Vernon, War Paint and Powder Horn.

Schultz, J. W., Sinopah, The Indian Boy.

Steen, Elizabeth, Red Jungle Boy.

Yates, Elizabeth, Amos Fortune.

S O C I A L S T U D I E S

Grade 6

A. Reading - Books, Magazines, Poems

1. Library books of familiar stories in foreign languages.

B. Maps and Models

1. Map work of all types - paper mache, salt, clay, etc.

Learning to read maps correctly.

2. Making globes. The supplies needed are - wheat paste, a balloon, paper towels, poster paint and airplane glue. The balloon is blown up to the desired size and tied securely with a string. Each day for three successive days, paper towels wet with a thin mixture of wheat paste and water are applied to the balloon and hung up to dry. When thoroughly dry, the entire globe is painted with blue poster paint to represent the water on the earth. Accurate copies of the continents, countries, etc., are obtained by use of tracing paper, colored with crayola, cut and pasted on the globe. A great deal of mathematical calculation and precision as to relative size, etc., is required to achieve an acceptable product. Distances, routes and many other such activities are possible in this project. To make the globe more permanent, a coat of clear shellac may be applied when it has ben completed.

C. Drawings - Pictures, Murals, Cartoons, Scrapbooks, Charts, Booklets

1. Charts made up of currency from various countries.
2. Study and drawings of boats used for various industry and travels in the many ages.
3. Study of stained glass windows worked into Art class (Use crayola, wax papers, opaque paper, paints, etc.)
4. Murals depicting a country's development in travel, industry, communication, etc.
5. Cartoons - can be drawn to illustrate historical events or world news.

D. Reports & Discussion - Biographies, Question Lists

1. Make a list of buildings in this locality that show an influence of Greek architecture. Draw a picture of the side or front of one of the buildings.
2. Make reports on the following: Michelangelo, Raphael, Martin Luther, Johann Gutenberg.
3. Tell what happened before each of the following events:

King John set his seal to the Great Charter or Magna Carta.

The Great Council grew into Parliament.

E. Plays and Dramatizations

1. Pretend that the early Greeks had radios and that you are at one of the Olympic Games. Tell about the contestants, what they do, what they wear, what games are played and who are the winners.
2. Hold an imaginary press conference or radio interview with

some famous historical character. Examples might be Khrushchev, Stalin or Chiang Kai Check. This will require that research be carried on to learn as much as possible about the person's life, etc. This might be made more realistic by bringing microphones, costumes and tape recorders, etc.

3. Dramatization - Dramatize the important parts in the lives of famous men.
4. Radio quiz program - Have a radio quiz program near the end of the unit. A microphone might be made by some of the children while others are writing questions for the program.

F. Creative Writing and Talking

1. Pretend that you are a soldier in Hannibal's army. Write a letter to your people at home telling of your journey into Italy.
2. Imagine that you are living in ancient Rome. Tell something that took place that made the Roman people remember Julius Caesar.
3. Write an account of a tournament from the standpoint of a squire watching.
4. Imagine that you are a member of the First Crusade. Write an account of the city of Constantinople and what you thought of it.
5. Imagine that you are a serf. Tell the class in what sort of a house you live, how you get your food.
6. Pretend you are living in the Middle Ages. Write a letter to a friend, telling about the fair being held in your town.

7. Imagine that you live in the time of Alfred the Great.

Write a letter to a friend telling about the King.

G. Display - Exhibits, Collections

1. Plan an exhibition showing pictures and models of people and objects from the time before history to the end of the Middle Ages. It can be a parade of history.

a. Make a cardboard model of an Egyptian boat or a pyramid.

b. Make drawings of ancient Egyptian objects found in the museum or pictured in books.

c. Make a picture of a Hebrew shepherd.

d. Dress a figure (doll) in the style of a Phoenician trader as worn in ancient times.

e. Make a drawing of an ancient Phoenician sailing ship.

f. Draw pictures of ancient Greek objects.

g. Draw pictures of the clothing worn by the early Greek people -

1) A Greek boy, tending his sheep

2) An athlete at one of the Olympic games

3) Greek gods and goddesses

h. Make a model of the Parthenon from hard white soap.

i. Make a cardboard doll and dress it like a soldier of the Roman Republic.

j. Work with a group making cardboard models of buildings of a monastery.

k. Draw a picture or make a model of a Viking boat.

l. Make a model of a peasant's cottage - of wattles, sod

or wood.

- m. Copy a picture of a castle with moat and drawbridge or make a model of a castle.
- n. Find or draw pictures of monks, friars, templars and Hospitalers showing how each is dressed.
- o. Find pictures of some famous cathedrals built during the Middle Ages to show how Gothic architecture looked.

H. Local Research - Interviews and Miscellaneous

1. Materials

- a. Maps and Globes.
- b. Large wall maps which may be written on with chalk.
- c. Study sheets.
- d. Encyclopedias, atlases, National Geographics and travel magazines.
- e. Current newspapers and news magazines.
- f. Pictures, library books and materials - reading lists.
- g. Dictionaries.
- h. Films, slides, radio, TV, recordings, etc.
- i. Current children's papers such as My Weekly Reader, Junior Scholastic or the Young American Reader.
- j. Free travel materials.
- k. Many opportunities are presented by the pupils themselves, as many of them have been in the countries which they will be studying.
- l. Many of our neighbors are eager to tell of their mother country and would be willing to speak to a class.

- m. Records
 - n. Cartoons.
 - o. Specimens, objects, models.
 - p. Reproductions of historical documents.
2. Teacher materials.
- a. Oak tag
 - b. Magazines
 - c. Local advertisements
 - d. Paper - construction, news print, penmanship
 - e. Crayons
 - f. Marking or labeling pencil
 - g. Reference books - encyclopedias, library books on transportation, farms, cities, gardens.
 - h. Paste
3. Recommended materials (to be ordered)
- a. Compass (Academic Aids p. 50 - Princeton, New Jersey)
 - b. U. S. map puzzle (Academic Aids p. 51)
 - c. Inside World Map puzzle (Creative Playthings, Inc., p. 109,
Princeton, New Jersey)
 - d. Game of the States (Milton Bradley Co., p. 28,
Springfield, Mass.)
 - e. Tagboard
 - f. Clay
 - g. Poster paper
 - h. Stationery and envelopes (Colborn, Grand Forks)

4. Filmstrips (available)
5. The English Colonies (B30 through B40 are good)

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accompanies Your World and Mine.

Pupil References

These may also be found in the Teacher's Manual and at the end of
each unit in Your World and Mine.

LANGUAGE ARTS

The following suggestions are examples of ideas that could be used for the purpose of enriching the experience of the mentally advanced student in the field of language arts. They are, however, only examples. A teacher should avoid going down the list and assigning one of these activities to a child. For instance, it would be unwise to ask a child to make an original reference book on pioneer tools just because this has been suggested. If the child exhibits an interest in airplanes, then this form of reporting his research might be used.

Enrichment activities should grow out of the needs and interests of the gifted child. To discover these interests, the teacher must be continually alert for even a minor expression of curiosity towards a subject which could be built into further study, particularly in the upper elementary grades where children are capable of much guided independent work. Some of these topics may not seem educationally worthwhile, but they may grow into a study that is.

It is also the teacher's responsibility to generate enrichment activities through group discussion, through the use of stimulating questions and through encouraging children to ask their own stimulating questions and follow them up with research and some sort of reporting procedure.

True enrichment comes about through the development of a classroom climate which frees and encourages the child to explore and grow in interests, knowledge and understandings.

LANGUAGE ARTS

Kindergarten

A. Creative

1. Dramatize Mother Goose rhymes, poems and stories. Arrange for props in the dramatization.
2. Tell original stories, rhymes to tell class. Dictate these to parents or teacher and make a booklet of them. Teacher may read these to class.
3. Mold characters in stories out of clay. Use figures to tell stories to class. Some stories may be original.
4. Draw mural showing incidents in sequence of a favorite story. Use in moving picture box while child tells the story.
5. Tell stories (to class) of original pictures they have drawn or painted.

B. Recreational

1. Bring books from home or library. Show to class and tell story from the pictures. (Have a child or two actually do this in Kindergarten.)
2. Arrange a display of books on the classroom library table on topics like holidays, seasons, animals or toys.
3. Assemble materials for a "Storyteller's Kit". Make paper character figures, backed with tabs of sandpaper, to use on a flannel board while telling stories. Visit other classrooms to tell stories.
4. Encourage the bright child to make up original riddles to

have class give the answer.

5. Have child collect pictures for special holidays and arrange on a bulletin board. Explain bulletin board to class.

C. Appreciation

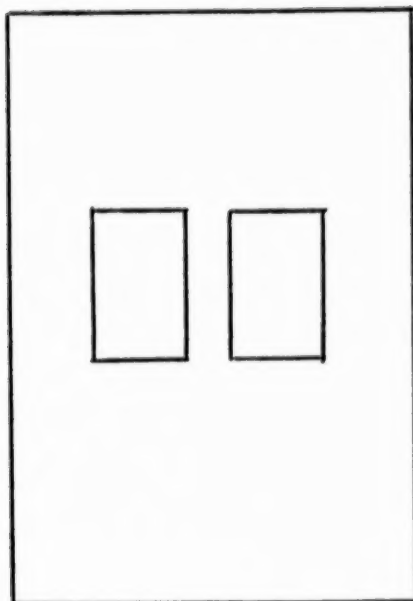
1. Let child take a group of three or four children to library table and lead them in a discussion of the story and pictures of a book which has been read to the whole class.
2. Listen to a recording of music. Draw a picture of what they have heard.
3. Collect jackets of story books they like. Arrange a display.
4. Make a booklet of experiences or fanciful stories that are dictated and typed.

D. Developmental

1. Pictures from magazines can be pasted on cardboard cut in various pieces. Child can arrange pieces to make the picture.
2. Have children collect pictures of various vehicles, foods, heating equipment, clothing, etc., and arrange them according to use.
3. Collect pictures of animals and objects and arrange according to size.
4. Collect pictures from old readers, textbooks, magazines or newspapers. Parts of pictures are cut off, children find missing part and arrange in order.

Example: fender cut off a car, tail off a cat, etc.

5. Matching:

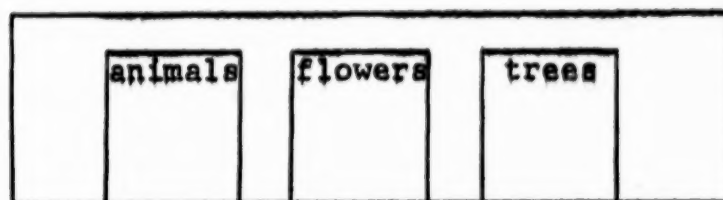


Cut out oblongs in two cards fastened together back to back. Paste pictures to match on two strips of cardboard. Slide strips between cards so matching pictures will appear in openings.

Example of matching pictures:

- a. Mother animals and babies
- b. Trees and fruits produced from them
- c. Letters
- d. Words

6. Make chart with envelopes. Cut pictures from magazines, etc., and place in proper envelope on chart.



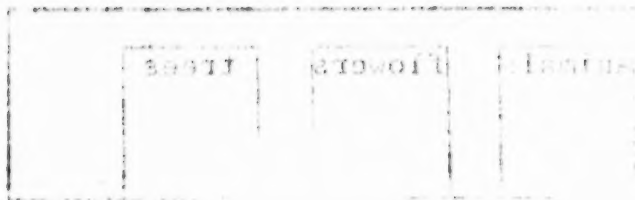
7. Give child a booklet with a letter on top of each page. Child collects pictures that start with each particular letter to paste in the booklet.
8. Classify pictures all children may bring to school so they can be pasted in large books.
9. Collect pictures of all the things that make sounds we hear around us every day and make a booklet entitled "Sounds"

Around Us". Example: pictures of bells that ring, clocks that tick, trains (whistle), etc.

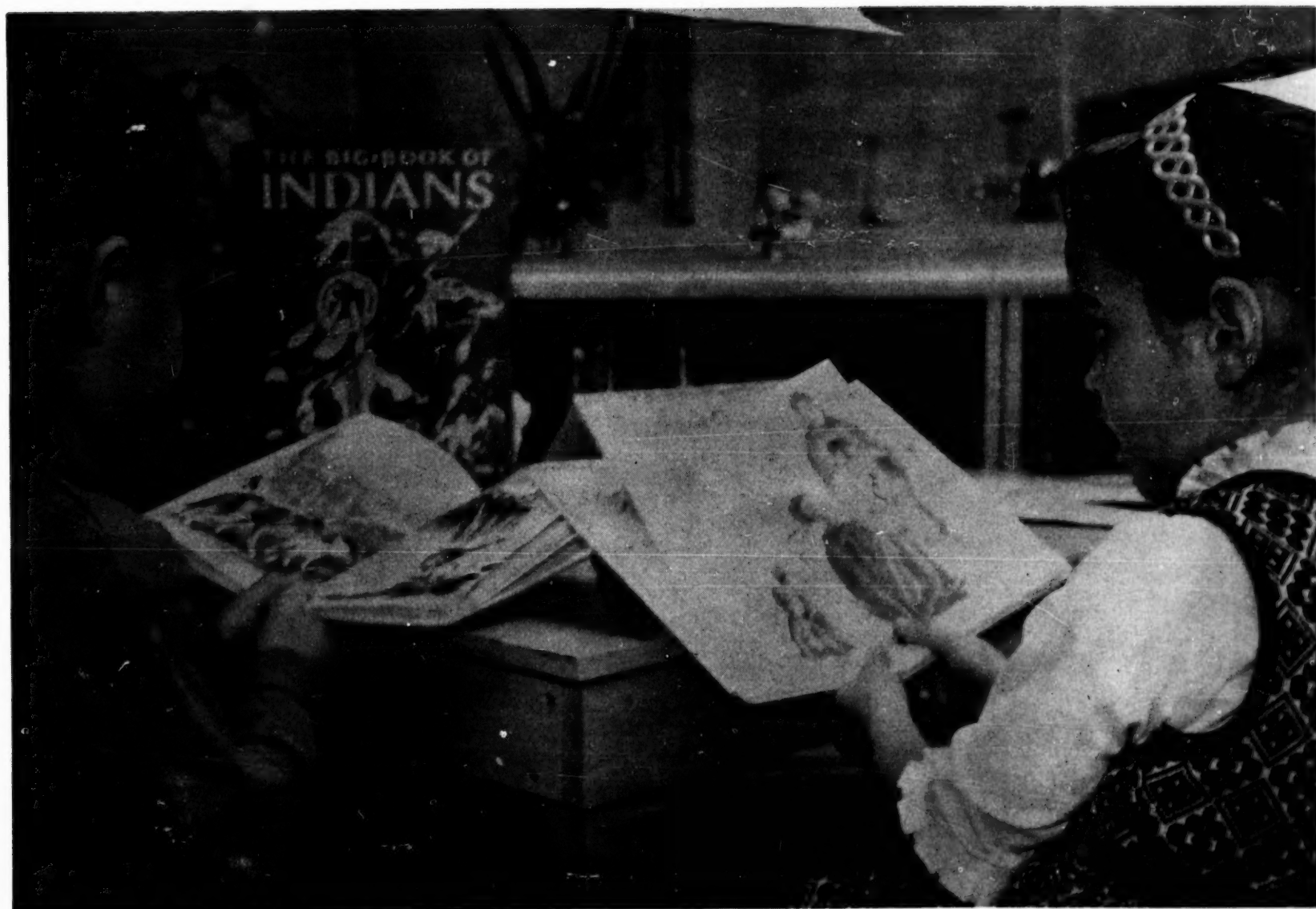
10. Play games with sounds. Example: Say words that begin with a selected sound as - b - baby, ball, etc.
11. Match the beginning sound of one's own name with pictures or objects whose names begin similarly.
12. Make up jingles that rhyme using names of children in class.
13. Compose action verses to illustrate how endings rhyme:

Jump on the floor,

Then go to the door.



LANGUAGE ARTS



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LANGUAGE ARTS

Grades 1 and 2

A. Developmental

1. Use various types of dictionaries:

- a. Picture.
- b. Those that demonstrate words in manuscript and cursive writing simultaneously.
- c. Have him make his own looseleaf dictionary adding words, via extra pages, as his vocabulary increases.
- d. Make a word book which classifies words as to use rather than alphabetically. (Example: Action words - Time words.)

2. Games.

- a. As - As (Father says "My whiskers are as scratchy as a porcupine", etc.)
- b. I saw phonics. (I saw a black bear - I saw a cawing crow)
- c. Synonym game.
- d. Word meaning - game of words spelled the same but having different meanings. (A fly sat on the tip of his nose. Don't tip the wagon.)

3. Classifying words from duplicated lists - putting them in proper columns. Example: wag - dog - bow-wow

hop - rabbit - pink eyes

4. Developing posters on health, safety, etc. In early first

grade you can have simple "yes" or "no" for captions of "right" and "wrong".

5. Classifying pictures, words, objects, etc., in representative categories of their choosing. (Machines on wheels).
6. Take responsibility.
 - a. Rotation of weekly duties and arrange bulletin board.
 - b. Lost and found bulletin board. (Pictured article could include name of finder, description of it.)
 - c. Library
 - 1) Plan categories for books.
 - 2) Take care of the lending cards and recommend books.
7. Take a leading part in such social correspondence - Composing get-well notes, permission requests, invitations, appreciation notes, thank yous.
8. Captions (Being concise is an art)
 - a. Bulletin board captions
 - b. Titles for class books
 - c. Captions for art work
 - d. Directions for maps
 - e. Wording for pretend telegrams
9. Descriptive speech
 - a. Describe a picture (laid on the teacher's desk so the others can't see) so vividly that classmates can draw it.
 - b. Describe favorite clothes or toys the same way.
 - c. Make a picture map of a trip (or to illustrate a city area) and discuss reasons for choice of illustrations.

- d. Explain and dramatize social situations.
- e. Organize steps in presenting a game to the room and plan "timing" so each step is learned before presenting the next.
- f. Explain hobbies and collections.
- g. "Chalk talk" and/or help others draw in easy steps.

B. Creative

- 1. Initiate an original story and -
 - a. Prepare a sequence of pictures either from magazines or original drawings for it.
 - b. Decide on pantomime actions for it.
 - c. Collect visual aids to make it more interesting.
 - d. Make it in rebus form, so pictures can take the place of unknown words.
- 2. Develop a favorite story read or heard -
 - a. As a dramatization
 - b. With a new ending.
 - c. As a TV production, using a big box as a TV screen.
- 3. Writing birthday and get-well jingles, followed by more thoughtful and perfected verse. (Real talent can be recognized and encouraged by sending products to magazines.)
- 4. Making up riddles and "tall tales". (Illustrating them will cut down writing necessary for their production.)
- 5. Developing dramatizations with special media like -
 - a. Puppets
 - b. Shadow pictures

- c. Flannel board characters of their own design
- 6. True experience writing -
 - a. For class newspaper
 - b. Diary or scrapbook of trips, etc.
 - c. Science notes
- 7. Plan a "Let's play it" series -
 - a. Store
 - b. Circus
 - c. Fire house, etc.
- 8. Making up plays from -
 - a. Favorite stories
 - b. Records (from home or public library)
 - c. Personal experiences
 - d. Songs that tell stories
 - e. Flannel-graph characters - commercial, figures from old readers, their own drawings
 - f. Marionettes
 - g. Pantomimes and shadow drama

C. Recreational

- 1. Reading
 - a. Teacher directed choice. (Example: weekly theme to encourage variety.)
 - b. Child's choice of silent reading.
 - c. Orally in a "Friendship group" where two (or at the most three) children read together on a mutual interest level, pooling their abilities to help one another.

- d. Supplementary and subject area amplification.
- 2. Choral reading - especially good for the shy child who cannot write and is shy about performing alone.
- 3. Poetry - "Children like poetry on -- Play activities, home responsibilities, pets, occupations, transportation, holidays, their relation to people, nature, humorous and ludicrous situations and surprises" - say Herrick and Jacobs.
 - a. Listening to the teacher (or a good recording). Present an individual choice - watch appreciation - growth develop and taste improve.
 - b. Silent reading of simple verse.
 - c. Oral presentation of favorites to the class.
 - d. Illustrating.
 - e. Writing verse.
- 4. A "sampling" of foreign languages - in the form of words for familiar things or phrases and words similar to our language.
- 5. Presentation of materials not original with them but much enjoyed.
 - a. Magic tricks
 - b. Riddles, limericks, tall tales, etc.
 - c. Imitations
 - d. Selecting special story areas

D. Appreciation

- 1. Child can make a scrapbook with the title "I Liked These Books Because" in which he shows by pictures and captions

what made the book particularly interesting.

2. Start a personal file box to record books read with simple classifications like - true, science, etc.
3. Design a "Guess Who" bulletin board of characters from different stories, adding catchy captions which will interest others in reading the stories.
4. Develop his descriptive power by urging him to "collect" and tell about sounds expressive of life around him.
 - a. In nature
 - b. In his environment
 - c. Human sounds (sad, happy, dangerous, humorous, painful)
5. Through carefully chosen phonograph recordings give him chances to sensitize himself to -
 - a. Descriptive sounds
 - b. Poetry - IF -
 - 1) Poem fits children
 - 2) Choice of reader appeals
 - c. Music that makes a tone picture
 - d. Stories
 - e. Action and motion
 - f. Emotional expression
6. Expose him to films and filmstrips which will widen his interests and encourage literary experiences.

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The Circus ABC. Jackson. 1955 Golden Book

Animal Dictionary. Watson. 1960 Golden Book

Teacher Resource Books.

* Index to Children's Literature. Rue.

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excellent "cross reference"
for subject areas. (Too
expensive for school purchase)

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Guides to Language Arts activities
p 357 - 367. Excellent detailed
suggestions of activities fulfill-
ing specific goals.

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- * Rassmussen and Storck, Fun Time Puppets. Children's Press. (Directions for making and using several types.)
- * Bill Severson, Shadow Magic. David McKay Company, 1959.
- * Manchotto Chutte, Around and About. E. P. Dutton Company. (Poetry with shadow-picture illustrations.)
- * Holeman, Hello and Good-By. Little Brown and Company. (Children's drawings in illustrations)
- * Let's Read Together. (Choral readings) Row Peterson Company.
- * Bennett Cerf, Book of Riddles. 1960 "Beginners Book", Random House.
- John McKee, American Riddles in Rhyme. New York: Abington Press.
- Scott Forseman, Writing Practice Pad. (2nd Sem. p. 13, 97, 119.)
American English Book I. John Winston Company, 1960
Fun-Time Magic. Victor Hovel, 1955 Children's Press.
- Amy Hugoboom, Drawing Series. Vangaard Press.

Magazines:

- * Checkmate (cartoon-caption writing)
 - * Highlights (cartoon-caption writing)
 - * Childrens Activities (for "rhebus stories")
 - * Wee Wisdom (for riddles)
- * available at Public Library

Dictionaries:

The Picture Dictionary for Children (not colored)
5079 words - 1442 pictures.
Both manuscript and cursive
writing. Colborn School
Supply.

Young Readers Picture Dictionary. Park Grossett and Dunlap.
(colored pictures)

LANGUAGE ARTS

Grade 3

A. Creative

1. Encourage original story telling.
2. Draw or paint a mural depicting scenes or characters from a story or book read. (Three or four who read the same book may work on it together)
3. Make a TV scroll.
4. Write original poems. May make rhymes for their family birthdays or for their classmates.
5. Construct puppets and scenery for a shadow play. (Stick or paper bag puppets)
6. Write a short play. Choose some of your friends to act in the play.
7. Exhibit self-created book jackets with a title for each. These may be exchanged and a story written to correspond with the picture.
8. Encourage children to make up a "tall" tale, using their imagination to create unusual exaggerations. Each child may draw a picture illustrating one scene of his tale.
9. Write new endings to stories or continuing stories.
10. Make a painting of your favorite books to place on the wall.

B. Recreational

1. Dramatize or pantomime a part of a story read by the children. Let them guess the part.

2. Set up an exhibition corner showing things that have been studied or read about.
3. Select some character from a story, write a conversation and read it to the class the way you think he would say it.
4. Describe or tell about some amusing character or part of a story he has read.
5. Prepare a short choral reading to be presented to the class.

C. Appreciation

1. Collect poems on a particular subject and make a chart or booklet.
2. Memorize a poem or part of one to recite to the class.
3. Select a poem and illustrate some part of it.
4. Read or tell to the class some interesting or amusing part from a book you have read.
5. Find information about some author whose stories or books you like especially well.
6. Do independent reading which may be shared with the class at times. Discuss a favorite story or read parts of it aloud for the enjoyment of the class.
7. Read and report stories similar to ones read in the text.

D. Developmental

1. Encourage children to search newspapers and magazines for news about recent inventions or something else of interest. Display pictures and articles on the bulletin board and label "News Clippings".
2. May organize a class book of famous men in American history.

Each pupil may take a different subject such as individual men, inventors, pioneer heroes, etc.

3. Encourage children to write summaries of men's lives. Make a booklet.
4. Stimulate children's interest in preparing a newspaper of their own. They may plan to report different kinds of news.
5. Write riddles describing story characters. Have children guess who is described.
6. Bring interesting or amusing pictures. Write a caption for each. Display on the bulletin board. May also write a short story about the picture.
7. Read to discover facts about certain animals or person in story.
8. Outline a story and present it to the class - using the outline.
9. Paragraph development. Make up a paragraph or find a paragraph on how to make something. Example: How to make a cake or how to build a camp fire. Leave out a sentence that is essential to the meaning. Read to class. See if someone will detect the missing idea.
10. Write a noun that suggests action. Ask the children to write five things which the noun does. Then ask them to name five words which tell about it.

Example: "boat" - leaks, sails, travels, stops, whistles.

"boat" - huge, grey, slippery, noisy, Navy.
11. Make a list of singular nouns. Let the child write the

plurals. He may need to look some of them up in books.

12. Anagrams. Write the word "animals" on the board or card. Underneath list several common animals in scrambled form. Example: dfal (calf), roseh (horse), noxe (oxen), lume (mule). To the right of these words draw a large outline of a barn. Ask the children to see how many of the animals they can drive into the barn. Unscrambled words written in the barn. This game may be varied in many ways such as: fruits and vegetables (basket), birds (tree, furniture (house), school supplies (school).
13. Syllable addition. For an interesting combination of arithmetic and language, try some two or three-step problems based on the number of syllables in a word. For example: Multiply the number of syllables in the word geography by the number of syllables in the word lunchroom. Add to it the number of syllables in the word refrigerators. What is the answer?
14. Sequence in paragraph development. Children work in pairs. Suggest topics such as making something, going somewhere, doing a project, etc. Then have them list the steps of the operations in correct order. On a second sheet list the same operations out of order. Then groups exchange papers and restore the sentences to their proper order. Example: Making sandwiches.

Mary wrapped the sandwiches.

Mary bought a half dozen eggs.

Mary mixed the chopped eggs with mayonnaise.

Mary shelled the eggs.

Mary cooked six eggs.

Mary spread the chopped eggs on the bread.

15. To stimulate vocabulary. Give children a large word to see how many smaller words they can make from it, using each letter once.
16. Word jump. The familiar game of picking up the last letter and naming a word beginning with that letter can be applied to a study of the parts of speech. For example, if the category is nouns, "elephant" would be a correct response to "ape", "table" to "elephant", etc. The game is good to play with nouns, adjectives and verbs.
17. "Fooler Paragraphs". Children may work in pairs. Let each pair create a "fooler paragraph" - one in which they include several sentences completely unrelated to the subject. Have the paragraphs read aloud with other children deciding which sentences should have been omitted. This can be humorous.
18. Sentence Scramble. Print each word on a cardboard strip. This may be done by the children. Then scramble the words on a flannelboard or at a table and see if the other children can write them into a good sentence form. The first child ready may arrange the words correctly on the flannelboard.
19. Print words and their meanings on separate strips of paper. Scramble. Match the meanings with the words.

MATERIALS FOR ENRICHMENT

Economo Sentence Builder No. 8134 - p. 41

Anagrams No. 4901 - p. 41

Economo Word Builder No. 8271 - p. 40

Link Letters No. 9503 - p. 43

Milton Bradley Company, Springfield, Mass.

Syllable Game No. A-4180 - p. 59

Creative Playthings, Inc., Princeton, New Jersey.

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LANGUAGE ARTS

Grade 4

A. Recreational

1. Sharing experiences - Children tell about what they like or dislike about television programs and actors. Give the time for a discussion. Differences of opinion will arise which should be discussed fully.
2. Make comic strips out of humorous story parts. Display.
3. Riddles - Make up riddles about interesting book or story characters. Let the class guess the characters described.
4. Favorite authors - Tell or write about his favorite author. Giving reasons why he enjoys this author's stories. Tell something about his life. Give a list of books written by this author.
5. Individual records - Children may keep in a notebook individual lists of books, stories, and poems they have read independently.
6. Enjoying puns - After understanding what a pun is, they may contribute puns. A few examples for a "starter":
 - a. A man says he has discovered the color of the wind.
He went outside and found it blew.
 - b. When the boy found a button in his salad he remarked,
"I suppose it fell off while the salad was dressing."
 - c. You shouldn't tell secrets in a cornfield because it has
so many ears.

7. Interpreting generalizations in light of total context.

Old sayings: As a "starter" mention a few and then see how many the pupils can find or think of. Try to interpret them.

Examples:

- a. The watched pot never boils.
 - b. Big oaks from little acorns grow.
 - c. Little by little moves a mountain.
 - d. If you carry a calf every day, you'll be able to carry the cow.
8. Dramatize or illustrate a part of a story for someone else to read or tell.
9. Make pop-ups of funny story people. Write nonsense stories.
10. Related reading to life experiences. Child can illustrate some of his own experiences related to the story read. Write a caption, or write a paragraph. Give them opportunity to show or read them to the class.
11. Bring to school a book or magazine from the library of home that contains a story in relationship to a story read in basic reader.

B. Appreciation

1. Oral reading of choice bits and favorite stories by pupils.
2. Miscellaneous "advertising".
 - a. Display and give an explanation of illustrations in books and magazines.
 - b. Use of bulletin board:
 - 1) Display posters that feature favorite stories and poems.

- 2) Display of book jackets.
- 3) Posting of brief book reports that may tell title, author and reason for enjoying the story.
- 4) Charts that contain names of the pupils and indications of books read.
 - a) Star per book.
 - b) Cut-out facsimiles of book with title on it, possibly indicating degree of liking by color.
3. Brief oral reports that tell only enough to stimulate the curiosity of listeners.
4. Dramatizing parts of stories.
5. Read to class individual found materials.
 - a. Jokes
 - b. Anecdotes about great men.
6. Memorizing choice bits of poetry.
7. Have a "recall-day" wherein a short period is set aside for the pupils' voluntary recitation of remembered poetry.
8. Engage in choral reading.
9. Have a book parade. Show pictures or book jacket and tell some facts about the book.
10. Play book salesman. Advertise a book.

C. Developmental

1. Have pupils arrange topics in order when presented in scrambled order.
2. Have the pupil reproduce a selection for a classmate who has been absent or for an extra-class person or group.

3. Make outlines, selecting the main ideas in a story that was read.
4. Have them locate supplementary information to help in a class or individual project.
5. Have pupils complete unfinished stories.
6. Put together in order of happening a cut-up story.
7. Have pupils explain why certain factor is true by making a summary of all the reasons for its being true.
8. Let committee help - May collect from the library and other sources good books or articles related to the unit being studied.
9. May list questions on a chart related to a certain unit in order to find out more information. Then as children come across information shedding light on the answers, they jot down alongside the questions, notes on where the information could be found.

Example of questions on Historical Unit:

- a. How did the pioneers live?
 - b. What kind of schools did they have?
 - c. What kind of clothes did they wear?
 - d. What books did they read?
10. Cultivate imagination through picture reading. Use all levels of picture reading: naming objects in the picture, telling what is happening and interpretation.
 11. Critical thinking - Apply facts read in a story to the lives of the pupils.
 12. List all words used in place of said, such as muttered,

shouted, squeaked. (Elementary English, November 1960, pages 447-8. Gives an account of 104 words found that could be used for the word said.)

13. Relationship - Pupils may be asked to compare characters, settings, situations, plots to elaborate on an idea developed in a story by drawing on their independent reading.
14. Sharing Good Passages - Be on the alert for passages to share with the class - vivid descriptions, exciting conversations, incidents filled with suspense. Practice reading before presenting.
15. Supplementary reading - This is excellent and should be used frequently.
16. Unit research projects - Use references and other resource materials.

Example:

- a. Early Days - Write a local history telling who the first settlers were, where was the first church, school, etc.
 - b. Modern Wonders - Scientific developments now under way.
17. Relationships - Pupils may enjoy comparing past, present and making conjectures, if they can, about possibilities for the future. Example:

	<u>In Pioneer Day</u>	<u>Present</u>	<u>Future</u>
Power -	Steam developing	Electricity	Atomic
Housing -	Log, sod	Brick, wood, concrete	Steel, glass plastics
Clothing -	Leather, homespun wool	Synthetic fabrics	Glass, plastics

The following illustrations may be treated similarly:

Food, household equipment, farm equipment, travel and transportation.

18. Quizzes and games - Develop games for a "surprise box" which may be used during free periods. Example:

Write five important statements about a person, place, or thing on a card. At the bottom of the card write "Who (or what) is it?" Give the answer on the back of the card. Use famous landmarks or famous people.

19. Matching - Cut out small, attractive pictures from magazines or old books. Prepare a set of cards with a sentence or paragraph on each card, describing one of the pictures. Put the cards and pictures in an envelope. The pupil matches the cards with the pictures.

20. Specific types of comprehension -

Puzzle maps - Cut maps from old geography text books or atlases. Cut each map into ten or fifteen small pieces and place in an envelope. Write five questions regarding the map on the outside of the envelope. The pupils put the map together and write answers to the questions.

21. See the world - Make a list of the cities pupils choose to visit on a study of a particular country. Appoint ticket agents to represent each city. Each agent is provided with a written set of questions which the pupils must read and answer before they can board the plane to leave the city.

22. General comprehension -

Spare-time grab bag - Write a question or assignment on a 3 x 5 index card. Put the cards into a large envelope or box. A pupil may "grab" a card when he has some spare time. Separate envelopes or boxes with different assignments may be prepared for the various reading levels. The pupil should write his name on the back of the card that he has drawn so that he and the teacher know what assignment has been "grabbed".

Sample assignment: "The book called SEA STAR is fun to read. Find it in the library and read it. When you have finished reading it you may quietly tell a class friend about it. Be sure the friend has completed his work and wants to hear the story."

23. Simple charades - A charade is a guessing game in which each syllable or word is dramatized. In the middle grade it is better to dramatize words only.

Example: A stitch in time saves nine.

24. News reading - Bring news items from newspapers.

25. Crossword puzzles - Work original crossword puzzles.

26. Creative writing - Put down ideas in free verses. A free verse poem can be a picture, a song, or a feeling wrapped in words. Encourage children to make vivid word pictures. "Starters" such as following, can be used to stimulate the writing of free verse:

Brown is a beautiful color

It is the color of chocolate cake,

and gravy, and my new shoes.

Brown is the color of my father's easy chair

and leaves in the fall

Brown is my favorite color.

27. Dramatic Play - Have pupils write their own dialogue for plays based on familiar stories. Use pantomime.
28. Creative writing - Suggest that pupils write a "tall tale" about what happened on the way to school.
29. Write new endings to familiar stories.
30. Discuss figurative language with the children. List examples on chalkboard (itching feet, a nose for news, in the pink, fit as a fiddle, silly as a goose). Pupils may make a list of additional phrases. Discuss these phrases and their meanings.
31. Pupils may have fun collecting circus sounds, night sounds, playground sounds and Christmas sounds. Example: Collection of baseball sounds, such as - whack of bat, whiz of ball, thump of glove, cheer of people.
32. Words are fascinating - Pupils may keep individual books entitled "Adventures With Words". Words may be classified and listed under categories such as these:

Plain words - run, man, bread

Dignified words - residence, gentleman, lady

Undignified words - junk, screech, bawl

Childish words - kitty, naughty

Humorous words - galloping goldfish

Action words - jet, engine, helicopter

Geography words - river, tributary, resources

Emotional words - home, mother

Quaint words - thee, thou

33. Compound words - Print compound words on cards. Snip the words apart into their component parts. Have the pupil rearrange these slips to see how many big words he can make from the little words. This may be played as a game by having two pupils competing. The one making the largest number of compound words wins. Partners may also play.
34. Sentence races - Partners may try writing an intelligible sentence in which each word begins with the same letter. Suggest the letter b. At the end of a given period of time have the sentences read. Those partners who have written the longest intelligible sentence in which all words begin with b win a point. Example: Bad boys bring big black bugs.
35. Modified puzzles - Give the first letter and correct number of spaces. The player who fills in the correct words first wins. Example:
1. to set on fire k----- (kindle)
 2. to conduct oneself b----- (behave)
 3. the way to be traveled r---- (route)
36. Modified puzzles - begin the puzzle with a six-letter word. Drop one letter and rearrange the remaining letters to form a five-letter word. Drop one letter and rearrange the remaining letters to form a four-letter word and so on.

Example: 1. the kitchen of a boat ----- (galley)

2. a narrow passageway ----- (alley)

3. to cry out in loud tones ----- (yell)

4. an extension to a building --- (ell)

37. Modified puzzles - List of words may be given whose meanings can be changed by adding a letter at the beginning, end or within the word. Examples:

boa - add a letter that makes a vessel (boat)

ease - add a letter that makes a frame for holding
a picture upright. (easel)

room - add a letter that makes a long handled
brush (broom)

came - add a letter that makes an animal (camel)

count - add a letter that makes a division of a
state (county)

cot - add a letter that makes a wrap (coat)

dead - add a letter that makes a fear (dread)

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LANGUAGE ARTS

Grades 5 and 6

I. Developmental Activities

A. Word Study

1. Work on synonyms

- a. Try to find two more words with similar meanings.
- b. Try to find as many words as possible with same meaning.
- c. Find the antonyms for these words.
- d. The "Onym Game".
 - 1) Make a list of ten words for which you can find both an antonym and a synonym.
 - 2) Make up five sentences. Underline one word in each for which you want a synonym. Pass the paper to the next boy or girl to supply the synonym.
 - 3) Scrambled words. Each group of scrambled letters, correctly arranged, spells the word whose definition or synonym follows. The children can make the lists of scrambled words and definitions.
 - 4) Find or make crossword puzzles.
- e. Study of first names - find them in the dictionary.
 - 1) List all the first names in the class under the headings - Hebrew, Teutonic.
 - 2) List surnames of class under one of these headings -

- a) List names derived from personal characteristics, nicknames.
 - b) Names derived from the place where a person lived.
 - c) Names derived from office.
 - d) Names of occupations or businesses.
 - e) Surnames derived from first names.
- f. How places got their names.
- 1) List towns named for people.
 - 2) List towns with American Indian names.
 - 3) Find for whom or what each of the original thirteen colonies was named.
 - 4) From what languages did some towns get their names, such as San Francisco.
 - 5) These words have amusing histories - unearth them:

assassin	accumulate	locomotive
thug	chivalry	pompous
balance	curfew	optimist
anniversary	spinster	answer
budget	mortify	hippopotamus
- g. Study the history of words.
- 1) Do research on the family of languages.
 - 2) How has the English language developed?
 - 3) The origin of our alphabet.
 - 4) Words borrowed from other languages.
 - 5) Reasons for invention of words.

6) Words from the names of famous people.

7) First writings of words.

h. Treasure chest of words.

Collect special words and their definitions in a notebook. These could be words having to do with any subject. This would increase spelling and reading vocabulary.

i. Make the game Authors with Endings - Make four cards for each root word to be practiced, placing a different key word at the top of each card. Examples of the four cards for the word "grow" -

<u>grow</u>	<u>grows</u>	<u>growing</u>	<u>grown</u>
grows	grow	grow	grow
growing	growing	grows	grows
grown	grown	grown	growing

Deal six cards to a player. The player will sort his cards, placing the same root words together. Any player who has four cards with the same root word may make them into a "book" and lay that book down. The player to the left of the dealer calls for any of the three words listed below the key word on any card held in his hand. If any other player holds the card containing the called word as a key word, he must give the card to the player who called for it. A player continues to call words as long as he draws a card from another player. When he fails to draw a card, he

must draw from the pack and then discard. That ends his turn. The object of the game is to complete as many books as possible. The game may be terminated at any time and the player with the most books is declared the winner. Use other words such as "rain", "thank", etc.

Although the game could be made by the mentally advanced, this would be excellent practice for all children in the class.

II. Speaking

- A. Interview resource people in preparation for an oral report.
- B. Develop and use techniques for debates, panel discussion and parliamentary procedure.
- C. Tell the class original stories.
- D. Select poems suitable for choral work and arrange them for a choral speaking group.
- E. Leading class discussions. Summarizing class discussions orally or in written form.
- F. Making inquiries and arrangements by telephone for exhibits or materials to be sent to the classroom.
- G. Making oral reports of reading, observations, excursions and experiments. (factual)
- H. Making oral reports of aesthetic experiences - concerts, plays, art museums. (interpretive)

III. Listening

- A. Listen critically to debates, discussions, newscasts and talks

- to form opinions, to hold discussions, to draw conclusions.
- B. Listen to radio and television performers to discover errors or difficulties in speech, new words, beautiful and appropriate words.
 - C. Make and listen to own voice recordings to discover errors or difficulties.
 - D. Listen for and make a list of sound effects used on a particular radio or television program and find out, through research, how these sounds are produced.
- (Some of these suggestions could be acted upon at home and then reported on to the group or class.)

IV. Reading

- A. Use library resources such as card catalog, atlas, yearbooks, and Reader's Guide to locate and gather additional information on a topic.
- B. Use dictionary, glossary and thesaurus to improve the range and exactness of effective vocabulary.
- C. Read classics such as Alice in Wonderland, Wind in the Willows, It's Perfectly True, The Jungle Book. A good way to get them interested is to read parts of the books aloud and then give them to mentally advanced children.
- D. Provide a variety of newspapers and magazines. Discuss the material with the idea of developing in them the ability to critically evaluate what they read.
- E. Select poems and stories which illustrate specific types of writing.

- F. Read materials to deepen and broaden hobbies.
- G. Design and follow a well-balanced leisure time reading program.

V. Writing

A. Factual

1. Writing requests for, selecting, setting up, and maintaining materials for class centers of interest - science, for example.
2. Making requests by letter for exhibits to be sent to the classroom.
3. Writing requests for materials for own use.
4. Making written reports of reading, observations, excursions and experiments.
5. Preparing outlines for discussions.
6. Make original reference books containing pictures from newspapers and magazines, original sketches and brief explanatory paragraphs about such subjects as Pioneer Clothing, Important Utensils, Means of Transportation, etc.

B. Factual and Creative

1. After reading biographies:
 - a. Write "Who Am I" sketches.
 - b. Write a biography pretending to be a certain person.
 - c. Write a quiz program such as "What's My Line" to be used as a review of biographies for the entire class.
 - d. Make a character trait chart for each biography read.
 - e. Write an autobiography.

- f. Write imaginatively the life of an historical character or person living in a particular period.
2. Write dramatizations of historical events and stories, directing their production.
3. Publish a class newspaper. A variation on this is the Wall Newspaper. Mentally advanced pupils can be responsible for writing up material in newspaper form, and for the over-all design of the newspaper and for the art work.
4. Make book reports.

C. Creative

1. Write original stories and poems.
2. Use characters in a reading story in a new adventure.
3. Write letters to foreign correspondents.
4. Express in written form feelings about music, paintings, etc.
5. Make written reports of aesthetic experiences - concerts, plays, art museums.
6. Write on topics which engender creative thinking, such as:
 - a. Basic problems of civilization.
 - 1) Wheel and its importance to transportation.
 - 2) Increasing the food supply.
 - 3) Conquering the environment.
 - 4) Development of laws and rules of behavior.
 - b. Development of common things.
 - 1) How miracle fabrics of today came about.
 - 2) How such articles as the can opener, pencil,

fountain pen developed.

3) How such things will look ten years from now.

4) What changes would be made in sidewalks if people wore no shoes.

c. Imaginative living in another world.

d. Individual interests.

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M A T H E M A T I C S

Kindergarten through Grade 6

It is a fact that our academically talented children are among the most seriously retarded group to be found in the public schools. The chief reasons for this are that the majority of them are never sufficiently challenged to develop their potential and the materials for challenging them are not available to the classroom teacher. It is felt that these children can be cared for in the regular classroom if they are discovered and if the classroom teacher will realize the importance of leading them to use their greater capacity for achievement in academic fields.

The area of arithmetic is an important one and one in which enrichment is sometimes neglected. Academically talented children need a certain amount of drill and practice but their need is not as great as that of children of lesser ability. An over-emphasis on drill and practice can, in fact, cause them to develop an unfortunate attitude toward arithmetic and toward higher forms of mathematics which they will meet later. Grouping can take care of this problem in part, but ways of broadening the use of the concepts and facts they learn are seriously needed.

The purpose of this section of the syllabus is to give the classroom teacher resources which she can call upon to guide these children in attaining their greatest growth in the field of arithmetic.

A R I T H M E T I C

Kindergarten

I. Understanding of Number Relationships

- A. Make discoveries of groups in various objects such as apples, sticks, etc.

II. Measurement Tools and Concepts

- A. Take charge of seeing that the calendar is marked properly each day.
- B. Set play clock with regular clock for specified times during the day.

III. Social Applications of Arithmetic

- A. Measure shadows on playground at different times of the day.
Note the length and direction - report on changes.
- B. Plan, make and bring number games to school that all can use.
Act as leaders for these games.
- C. Make booklets about stories which contain number concepts,
such as -
 - 1. The Three Bears
 - 2. Three Billy Goats Gruff
 - 3. Little Red Hen
- D. Help determine how many napkins, boxes of milk, etc.,
are needed at each table for lunch. Supervise the setting
of the table.
- E. Make a booklet showing pictures of activities at various times
of day - lunch time, rest time, etc.

This could be made into a chart for the benefit of the whole class.

In and Out of School Uses of Arithmetic from Guiding Children's Arithmetic

page 289 Using rulers to plan size of garages made from boxes which could house equipment.

page 290 Noting the exact number of the page of a story, favorite songs, etc.

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ARITHMETIC

Grades 1 and 2

I. Computation Skills

- A. When counting children for roll call encourage counting by 2's, 3's and 5's.
- B. Count milk money - act as leader in counting it.
- C. Help other children -
 - 1. Recognize numbers to 10.
 - 2. Write numbers to 10.
 - 3. Group at flannel-board.
 - 4. Group with blocks, sticks, etc.

II. Understanding of Number Relationships

- A. Share with class original number story problems.
- B. Use number devices such as -
 - 1. Number counting board to 100.
 - 2. Arranging correct number of blocks on spindles on number board.
 - 3. Arranging large sticks, buttons, etc., in 10's - place value. Record numbers arranged on blackboard.
 - 4. Concrete grouping of objects, pictures on flannel board, etc. Record groupings on blackboard and write answers.
 - 5. Make a clock - help other children use it correctly.
 - 6. Make combinations with mounting board - record and write answers.
- C. Make discoveries of groups in various objects such as apples,

sticks, etc.

III. Measurement Tools and Concepts

- A. Check temperature daily - compare findings with reports on radio and TV.
- B. Take charge of seeing that the calendar is marked properly each day.
- C. Collect and mount pictures or make a booklet of pictures pertaining to measurements such as -
 - 1. Weight - scales - bathroom, produce, farm, etc.
 - 2. Liquid - pints, quarts, gallons.
- D. Help the teacher weigh and measure children in the room.
- E. Fold paper in $\frac{1}{2}$, $\frac{1}{4}$, or $\frac{1}{3}$ to prepare paper for an art project for the class.
- F. Measure objects in room with foot ruler or yardstick when needed for some project.
- G. Set play thermometer with regular thermometer several times each day.
- H. Encourage estimates of measurements.

IV. Social Applications of Arithmetic

- A. Measure shadows on playground at different times of the day.
Note the length and direction - report on changes.
- B. Plan, make and bring number games to school that all can use.
Act as leaders for these games.
- C. Make booklets about stories which contain number concepts,
such as -

1. Three Bears
2. Three Billy Goats Gruff
3. Little Red Hen

D. Help determine how many napkins, boxes of milk, etc., are needed at each table for lunch. Supervise the setting of the table.

E. Make a booklet showing pictures of activities at various times of day - lunch time, rest time, etc. This could be made into a chart for the benefit of the whole class.

In and Out of School Uses of Arithmetic from -Guiding Children's Arithmetic

- page 289 Using ruler to plan size of garages made from boxes which could house equipment.
- page 291 Checking the library cards - when taken if they are back in given times, etc.
- page 292 Planning responsible use of money.
- page 292 Making bulletin board of ways many things are measured.
- page 293 Setting up a calendar of events for each month, marking birthday - special activities, etc.
- page 293 Making floor maps.
- page 293 Comparing various classes of mail and their costs. Concept of distances mail may be sent, etc.
- page 293 Preparing display of commodities according to weight.
(Example - 1# butter - 1# of another substance is different size such as 1# apples. A bushel is a big basketful.)
Judging - perishable substances must cost more.

Suggested Primary Activities from Arithmetic Teacher Nov. 1959 - page 247

1. Make a scrapbook about people who use numbers in their work (milkman, etc.)
2. Construct own ring toss game.
3. Develop a variety of measuring and estimating activities, ie, playground, home, height of flagpole, classroom, etc.
4. Keep a bar graph of attendance.
5. Draw maps of school yard, neighborhood, etc.
6. Chart of geometric figures in everyday life. Example - Circle - ring; sun. Oblong - bricks; books)
7. Emphasize the number element in science. (example - time for germination of seeds)

Suggested Activities from Teaching Arithmetic for Understanding, Marks, Purdy and Kinney.

1. Fill in missing numbers (Example: 2 plus ? equals 7).
2. Make a list of occasions outside class when they used numbers.
3. Working in pairs - one makes up the problem, the other tries to solve.
4. Describe the dimensions of the classroom.

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Foresman, 1956.

ARITHMETIC

Grade 3

I. Computation Skills

- A. Make a number collection. Use a box labeled "numbers" and deposit in it numbers cut from magazines and newspapers.
 - 1. Draw out a number.
 - 2. Around it place as many combinations as possible to make sum, difference, product or quotient.

II. Understanding of Number Relationships

- A. Make counting charts by 2's, 3's, 5's, 10's, etc.
- B. Make a chart to show number concepts with such quantity words as gallon, dozen, bushel and dollar.

III. Measurement, Tools and Concepts

- A. Make a collection using pictures.
 - 1. Heavy things and light things.
 - 2. Ways of measurement long ago and now.
 - 3. Early and modern ways of telling time.
- B. Charts
 - 1. Pictures to show things bought by pint, pound, foot, yard and quart.
 - 2. Find newspaper or magazine pictures to show how numbers are used in measurement.
- C. Make up problems making change from each of the following: quarter, half dollar and dollar.

D. Keep a record of weather or temperature.

<u>Day</u>	<u>Date</u>	<u>Weather</u>	<u>9A.M.</u>	<u>Noon</u>	<u>3 P.M.</u>
------------	-------------	----------------	--------------	-------------	---------------

E. Shadow Story Book

<u>Date</u>	<u>Time of day</u>	<u>Object</u>	<u>Length of shadow measured</u>
-------------	--------------------	---------------	----------------------------------

F. Keep own record of height and weight by the month.

IV. Social Applications of Arithmetic

A. Have a "Number" box which contains printed numbers cut from newspapers and magazines.

1. Select "price numbers" and draw illustrations of things that would cost each amount.

2. Draw out numbers from box. Make up problems which would use the numbers.

B. Make up arithmetic games and puzzles for others to enjoy.

C. Problems

1. Make problems from grocery advertisements.

2. Cut out pictures from magazines. Make up problems suggested by picture.

3. Make up arithmetic problems about using the library.

Find meaning of numbers on back of library book.

D. Reports

1. Ten ways of making a dollar

2. Learn how each wrote numbers from encyclopedia:

a. American Indians.

b. Ancient Chinese.

c. Ancient Arabic People

3. Ways arithmetic is used in each: bank, filling station, grocery store, post office.

E. Bulletin Board Displays

1. What I am saving my money for.
2. My trip to school.
 - a. Map showing route.
 - b. List how numbers are used going to and from school.
3. Using arithmetic all day.

F. Additional games and puzzles - see list following recommendations at end of Grade 6.

ARITHMETIC

Grade 4

I. Computation Skills

A. Construct practice cards of multiplication facts and division facts. They may help the slow learners do this.

B. Make special reports to the class or prepare dramatization on topics such as - The History of Money

Why We Have Money

C. Able pupils will profit from making drawings that show fractions. They may draw circles or squares and divide them (free hand) into equal parts. Later compare and discuss their drawings. Shade or color different parts. Instruct children to write below each drawing a numeral to represent the fraction illustrated. Display the drawings in the classroom.

II. Understanding of Number Relationships

A. Subtraction problems may be cut from old textbooks and pasted on 3 x 5 cards to give pupils more experience in making equations and solving problems.

B. Encourage children to choose different Helping Numbers, so that all are illustrated. Posters may later be set on the chalk rail in the right order.

5 is the Helping number for 6, 7, 8, 9

3 is the Helping number for 4, 5

2 is the Helping Number for 3

C. Have the pupils show eighths, sixths, thirds, fourths and

halves in circles, squares and rectangles. Use these figures for practice or for solving and checking problems.

D. Have the pupils make up division problems about -

37 apples and 2 baskets

16 marbles and 2 bags

20 cents and 3-cent stamps

E. Papers with problems may be exchanged. Each pupil may then solve the problems he gets and label the answers.

III. Measurement Tools and Concepts

A. What was the first weighing machine like? How did people weigh things long ago? Why was this an unsatisfactory way?
(Scott, Foresman & Company Expanded Notes p. 235)

B. A committee of more able pupils can make a thermometer in which tube of liquid is represented by a movable string, one half of which is colored red.

C. Charts may be made showing the equivalent values of coins through fifty cents. (Chart on page 267, Scott, Foresman and Company.)

D. Have the pupils list any situations they can think of in which the term average is used. Some situations that might be listed are given below -

1. Finding average heights or weights.
2. Finding average distance traveled each day on a four or five-day automobile trip.
3. Finding an average of one's marks in spelling for one week.
4. Finding the average of several scores in a game.

5. Have them figure the average temperature for a day or a week.
6. Figure the average height (in inches) of a group of five or six children in the class.

IV. Social Applications of Arithmetic

- A. Make special reports to the class or prepare dramatization on topics such as - The History of Money
Why We Have Money
- B. Family shopping gives opportunity to add dollars and cents. Find price of grocery items and add to find total of shopping list.
- C. Children enjoy leafing through seed, toy or mail-order catalogs. They will sometimes make out imaginary orders and total them.
- D. Have the pupils use a catalog or price list to make up problems about what playground equipment they would buy for their school if they had \$100 to spend.
- E. Have the pupils use timetables to make up problems about trips.
- F. Have the pupils list one day's activities with the approximate time for each activity.
- G. Have the pupils note the time they leave home and the time they arrive at school, determining the time spent on the way.
- H. Give pupils questions such as those below and see if they can supply a logical number situation for each question.
 1. How much money did they spend for stamps?
 2. What is the difference in cost?
 3. How much did one pencil cost?

4. What was the total cost of the party?

I. Puzzles and Games

Magic Squares

8	1	6
3	5	7
4	9	2

Making Magic
Squares

20		12
3		
10		2

You may begin by filling in a column, or a row, or from corner to corner. The number you put in the little middle square must be the average of the three.

J. Guess Again

A pupil-leader says he is thinking of a multiplication fact which has a certain product, say 24. Pupils try in turn to guess what the fact might be. If a pupil does not guess the fact the leader had in mind, the next pupil has a turn. This continues until a pupil guesses the fact, in which case the one doing so becomes the leader.

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Wheat, Kauffman, Douglas, Row-Peterson Arithmetic, Teacher's Edition,
Grade 4, Extensions pages 19T - 38T - Row-Peterson & Company, Evanston,
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Definite and Indefinite Number words -	p 19T
Dictation for Speed -	p 25T
A Number Chart -	p 25T
What is Wrong -	p 27T
Grouping -	p 29T
Bulletin Board -	p 31T
Estimating -	p 32T
Schoolroom Calendar -	p 33T
Weight Charts -	p 33T
Temperature Readings -	p 34T
Height Chart -	p 38T

ARITHMETIC

Grade 5

I. Computation Skills

A. Change specific problems into general problems.

1. Example: Janet is knitting a sweater with sleeves $16\frac{1}{2}$ inches long. She has knit $9\frac{1}{4}$ inches. How many more inches must she knit?
2. Generalized: Jane is knitting a sweater with sleeves so long. She has knit so many inches. How do you find the number of inches still to knit?

B. Read decimal fractions.

C. Fractions and whole numbers.

Report how fractions are used -

- | | |
|-----------------------|------------------------------|
| 1. Newspapers - books | 6. Traveling |
| 2. Home | 7. Buying and selling |
| 3. School | 8. Workers who use fractions |
| 4. Blueprints | 9. Why we need fractions |
| 5. Sports | to measure accurately |

D. Averages

1. Find average number of children absent last week.
2. Find average height of certain number of children in room.
3. Find average weight of certain number of children in room.
4. Find average annual rainfall. (Draw a bar graph to represent it.)

5. Find average temperature for a certain month.

II. Understanding of Number Relationships

A. Make up statements (try out on each other). Answers will be "always", "sometimes" or "never".

1. Dimensions of a rectangle are unequal - "sometimes"

2. An odd number plus 1 equals an even number - "always"

B. Average of a series of numbers and how affected by one low or one high number.

90	90	90	90
<u>30</u> av. 60	90	90	90
	<u>30</u> av. 70	90	90
		<u>30</u> av. ?	90
			<u>30</u> av. ?

C. Winston - Brueckner

Quick Way to Check Addition p. 195

Quick Way to Check Multiplication p. 231

Exercise "Working With Numbers" Relationships p. 259

Devising Several Ways of Finding Answers to Problems p. 377

D. Spitzer - Practical Classroom Procedures for Enriching Arithmetic

Multiplication by 11 p. 138 - 139

Multiplication by Dividing p. 137

Checking Products by Doubling p. 114

Watch This One p. 110

E. Scrapbook - to contain place value chart, fraction charts, games, puzzles, arithmetic tricks.

F. Picture graphs - relate to social studies activity using atlas, almanac or encyclopedia.

G. Scale drawings

1. Draw to represent distance from home to school, to library, etc.
2. Scale drawing of classroom.
3. From scale drawing find area of classroom floor.

H. Make up problems using the following together or in combination: proper fraction, improper fraction, whole number, mixed number.

I. Number puzzles and games.

1. Puzzles - (page references)

a. American Book Guide G 108 - 110 (yellow pages)

1, 2 - 11, 13, 14, 17, 20. Heath.

1) Just for Fun 64

2) Crossword Puzzle (Mult.) G. 92, Fractions G 149.

3) Magic Squares - Addition, Subtraction, Multiplication, Division G 101

b. World Book p 118, 230, 244, 264

c. Winston p 93, 113

d. Puzzles (Specific examples)

e. World Book p 118 Arrange digits 1 - 7 to add to 100.

You will have 3 2 place numbers

1 1 place number

f. World Book p 132 - Puzzle Holiday theme.

Make pattern on the board. Tree, heart, pumpkin, turkey, etc. Fill object with numbers. Purpose - to plan method of attack, not hit and miss. Find total

of: 12 nines, 9 eights, 8 fives, 10 sevens, 4
fours, etc. Multiply each kind and add.

- g. A boy works at a filling station. He earns \$1 for the first day, \$2 second day. How much money will he have at the end of the month?

Which is more? $\frac{1}{2}$ dozen dozen or 6 dozen dozen?

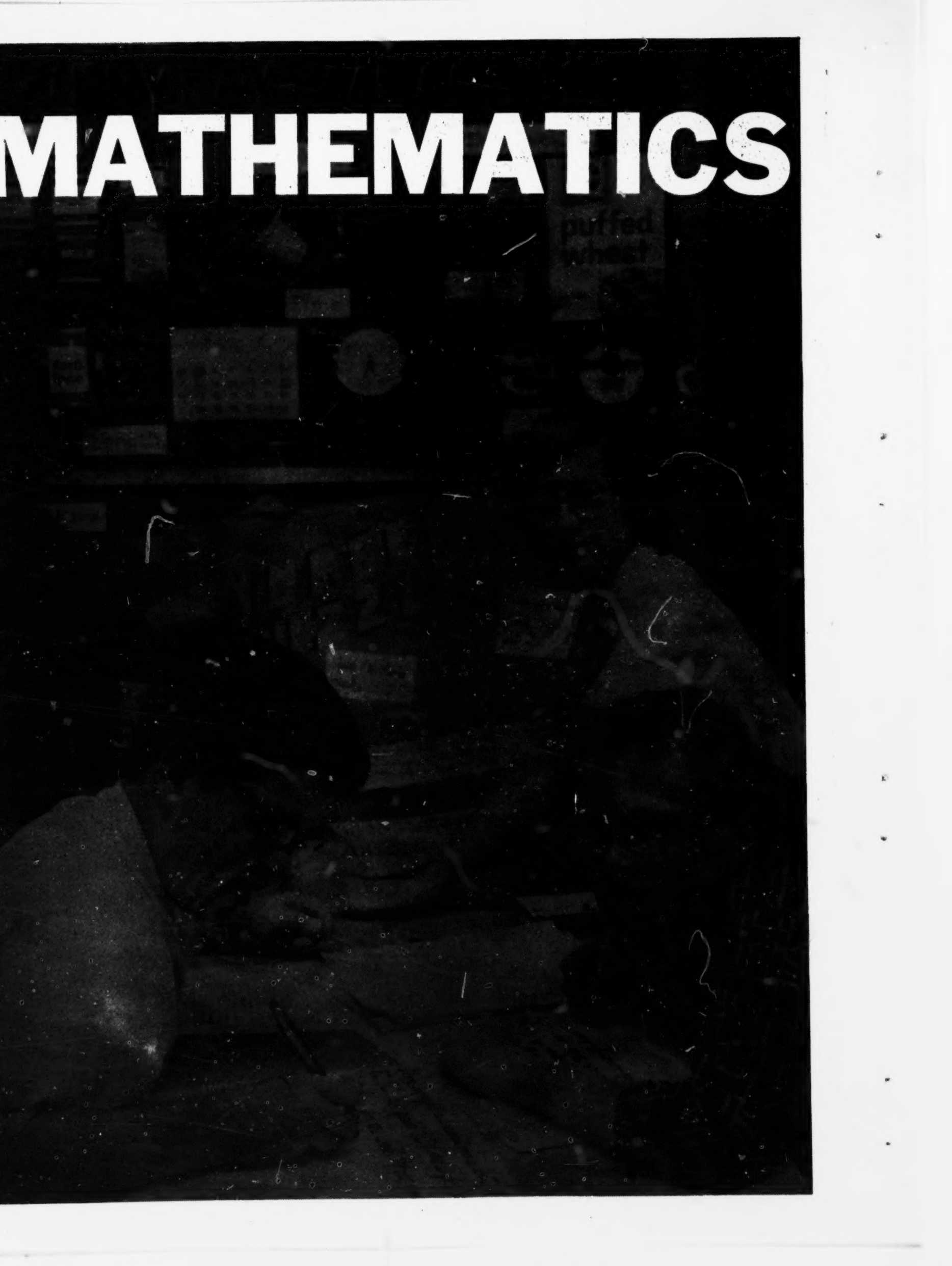
If 6 cats kill 6 rats in 6 minutes, how long will it take 50 cats to kill 50 rats?

If a train, one mile long, traveling at 60 miles an hour, enters a tunnel one mile long, how long will it take the train to pass through the tunnel?

2. Games

- a. Fraction Match - Scott Foresman, Guide p 273
- b. Make One " " " p 377
- c. Number Spelldown " " " p 359
- d. Roman Numeral Chart " " " p 359
- e. Who Are My Brothers?-American Book " G 111
- f. Relay Race " " " G 111
- g. Sorting the Mail " " " G 112
- h. Wheel of Chance " " " G 112
- i. Roman Number Game - Heath G 33
- j. Clock Baseball " G 185
- k. Game Multiplying by 10's Heath G 78
- l. Adding and Subtracting
 - Fraction Dominoes " G 148
- m. Multiplication Circle Drill - Winston G 22

MATHEMATICS



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ARITHMETIC

Grade 6

I. Computation Skills

A. Enriching Number Operations

1. Finding and using tests of divisibility.
2. Changing places in numbers to change value of given number.
3. Working out short-cuts.
4. Working out problems in different ways.
5. Give several ways to get the answers to the following:
 - a. $47 + 47 + 47 + 47$ (add, multiply or $4 \times 50 - 4 \times 3$)
 - b. $36 - 8 - 8 - 8 - 8$ (subtract or $36 - 4 \times 8$)
 - c. 30×47 (30×47 47×30 or 3×470)
 - d. $24 \overline{)96}$ (dive, subtract, divide by 8 three times)
 - e. At 3 for 15 cents, how much do 9 apples cost?
($15 \div 3 = 5$, $5 \times 9 = 45$, $9 \div 3 = 3$, $3 \times 15 = 45$.)
 - f. At 52 cents a pound, how much do 4 pounds of cheese cost? (add, multiply)
 - g. How much more than three yards are 120 inches of ribbon? ($120 \div 36 = 3 \frac{1}{3}$, $3 \frac{1}{3} - 3 = \frac{1}{3}$ yard,
 $36 \times 3 = 108$, $120 - 108 = 12$ inches)
6. Have students give additional illustrations of each use of fractions.
7. Have the class use rulers to show equivalent of $\frac{1}{2}$, $\frac{2}{4}$, $\frac{4}{8}$ and $\frac{8}{16}$ inches. Have them also count to $2 \frac{1}{8}$ inches, thus: $\frac{1}{16}$, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, etc.

8. Assign problems such as the following for pupils finished with assignment:

$$\begin{array}{r} 6? \\ ?1/3 \\ \hline 9 \ 2/3 \end{array} \quad - \frac{4\frac{1}{2}}{1\frac{1}{2}} \quad - \frac{6\frac{1}{4}}{3\frac{1}{2}} \quad - \frac{1 \ ?}{3\frac{1}{4}} \quad \frac{6 \ 3/4}{9\frac{1}{4}} \quad - \frac{674}{258}$$

$$\begin{array}{r} 375? \\ \times 6 \\ \hline 21,?18 \end{array} \quad \begin{array}{r} ?2 \\ 27 \overline{) 8??} \\ \underline{81} \\ 54 \\ \underline{??} \end{array} \quad \begin{array}{r} 5 \ \frac{1}{2} \\ - \ ? \ ? \\ \hline 2 \end{array}$$

9. Find the missing numbers in the following problems:

$$\begin{array}{ll} 14 = 12 = 30 - ? & 1\frac{1}{2} + 3\frac{1}{2} = 8 - ? \\ 16 - 10 = 2 \times ? & 4\frac{1}{2} - 3\frac{1}{4} = 15 - ? \\ 30 + ? = 60 - 18 & 5 \times 8 = 4 \times ? \\ 8 \times 5 = 160 - ? & 30 \div 2 = 60 - ? \\ ? \times 6 = 68 + 4 & 8\frac{1}{2} - ? = 3\frac{1}{4} + 4 \ 1/8 \\ 140 \div 28 = 48 - ? & ? + 4 \ 3/4 = 12 - 3\frac{1}{2} \\ ? - 50 = 10 \times 8 & 5 \ 1/3 + ? = 12\frac{1}{2} - 4 \ 1/6 \\ 30 - 24 = ? - 12 & 5 \ 3/4 + 6 \ 2/3 = 10\frac{1}{2} + ? \\ 40 - ? = 4 \times 4 & 7 \ 2/3 - 4 \ 5/6 = 17 \ 2/3 - ? \\ ? \div 16 = 8 \times 20 & 136 \div 17 = 12\frac{1}{2} - ? \end{array}$$

10. Prove that the square below is a magic square:

$1/2$	$1 \ 1/8$	$5/8$	2
$1 \ 3/4$	$7/8$	$1 \ 3/8$	$1/4$
$1 \ 7/8$	$3/4$	$1 \ 1/4$	$3/8$
$1/8$	$1 \ 1/2$	1	$1 \ 5/8$

II. Understanding of Number Relationships

A. Exploring the number system

1. Writing largest and smallest numbers using designated digits.
2. Experimenting with the decimal point to change the value of numbers.
3. Arranging fractions according to size.
4. Experimenting with number basis other than 10.
5. Work out number progressions.
6. Finding prime numbers.

B. Richer background of numbers - Explore and report on the history of numbers.

C. Tricks and puzzles.

1. How much is 5 plus 5 plus 5 times 5 times 5 minus 5 times 0 ? Answer - 0
2. If it takes 1 minute to make each cut, how long will it take to cut a 16 foot pole into 16 equal pieces?
(Answer - 15 minutes since 15 cuts make 16 equal pieces.)
3. See whether you can figure out a way to take 1 from 29 and have 30 left. (Answer - Take I from XXIX and you have XXX or 30)
4. Combine 4 fives so that the value they represent will be 56. (Answer - $55 \frac{5}{5}$)
5. A boy bought a baseball and a bat for \$2.50. He paid 50¢ more for the bat than for the ball. How much did he pay for each article? (Answer - The bat cost \$1.50, the ball

\$1.00.)

6. A snail starts at the bottom of a well which is 18 feet deep. Each day he climbs up 3 feet and each night he slides back 2 feet. How long will it take the snail to reach the top of the well? (Answer: 16 days. At the end of 15 days the snail has climbed 15 feet. On the 16th day he will climb 3 feet and thus reach the top.)
7. In some places in the desert, water is scarce and is sold by the bottle. But bottles are also very scarce; in fact, they are more difficult to locate than water. Sometimes a traveler reports that he pays \$1.00 more for the bottle than he does for the water and that he pays \$1.18 for a full bottle of water. How much does he pay for the bottle and how much for the water? (Answer - The bottle costs \$1.09, the water .09.)
8. If 6 cats kill 6 rats in 6 minutes, how long will it take 50 cats to kill 50 rats? (Answer - 6 minutes)
9. What number is as much greater than 36 as it is less than 94? (Answer - 65) The difference between the two numbers is 58 and half of that is 29. 36 plus 29 equals 65; 94 - 29 equals 65.
10. Which is more, a half dozen dozen or six dozen dozen? (Answer - six dozen dozen - 72 dozen or 864.)
11. Write a secret number on a piece of paper and don't show it to anyone. Then multiply your number by 2, add 10, divide by 2 and subtract the number you started with.

Now compare your answer with those of other pupils. (If no one makes a mistake, everyone will have the answer 5.)

12. Try this number trick on a friend: Write a high number on a piece of paper. Now write another number underneath it. I will write the third number in the column, you write the fourth and I will write the fifth. I can tell you the sum of these numbers at once.

Suppose your friend wrote - 6748254

3582196

You would write as third number -6417803

He would write - 4263871

You would write - 5736128

26748252

Explanation: When you write the third number, use numbers which complete the sum of 9 with the figures directly above in the second number. Do the same when writing the fifth number. Now the answer must be the same as the first answer in the column except that 2 is subtracted from the ones place of the top number and a 2 is placed in front of the top number.

D. Games

1. Who are My Brothers?

This game can be used most successfully in reviewing multiplication or division facts. A pupil goes to the front of the class and says "I am (gives a number that can be factored) 24. Who is my family?" Children then take

turns in giving factors of 24 such as 3 and 8, 2 and 12 and so on. Set a time limit on answers. If a pupil can suggest a number which the class cannot factor, he scores 1 point.

2. Relay race.

Divide the class into teams. Write the numbers 1 to 9 on the board as many times as you have teams. Name a number between 0 and 10. The first child in each team runs to the board and multiplies each board number by the number given. The student finishing first scores one point for his team.

3. Wheel of chance.

Make a large wheel on white construction paper, placing the numbers 0 to 9 on the circumference. Cut out an arrow with a slit at the tip for insertion of different numbers. Attach the arrow to the center so that it can be spun. Each child should spin the arrow and if the number on the arrow is 4 and the arrow points to 7, the pupils says "28". Each child should keep a bar graph showing the number of correct answers for each game played.

E. Enrichment.

1. Have the children add and subtract the following numbers and others to demonstrate the difficulties that arise:

XLVI
XXIX

Show how much simpler the work is with Arabic numerals.

2. Make a graph showing to the nearest hundred thousand the population of your home state. Use picture of a man to represent one hundred thousand.
3. Have the children prepare exercises on estimation. Have the children read their problems aloud to the class.
4. Find several illustrations of bar graphs in other printed sources. Discuss the graphs in school.
5. Magic Squares.

$\frac{1}{2}$	6	4	?
	$3\frac{1}{2}$	$5\frac{1}{2}$	1
$7\frac{1}{2}$		5	$1\frac{1}{2}$
	$4\frac{1}{2}$	$2\frac{1}{2}$	8

$2\frac{1}{4}$		$\frac{1}{2}$	$1\frac{7}{8}$
	$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{1}{4}$
$1\frac{3}{8}$		$1\frac{1}{8}$	$1\frac{3}{4}$
	$2\frac{1}{8}$	2	

The sum of all rows and lines should be the same. What are the missing numbers?

Have the children make their own magic squares.

6. Egyptian multiplication. To multiply, the Egyptians used a method called doubling. To multiply 18×32 , they proceeded as shown below.

<u>A</u>	<u>B</u>
1	32
2	64
4	128
8	256
16	512

The top number under A is 1. Notice that each number in A below the 1 is double the number above it.

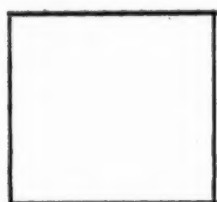
The top number under B is 32, the number being multiplied. Notice that each number below the 32 is double the number above it. Because $18 = 16 + 2$, to find the product of 18×32 , add the 64 and 512 under B. Their sum is 576, which is the product of 18×32 . Multiply 18×32 in the usual way to check this answer.

III. Measurement Tools and Concepts

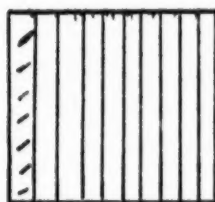
- A. Making graphs of distances, areas and amounts.
- B. Explore history of measurement.
- C. Study measurement of time through the ages and the development of our present day system as well as possible changes in the future.
- D. Have the class use rulers to show equivalent of $\frac{1}{2}$, $\frac{2}{4}$, $\frac{4}{8}$ and $\frac{8}{16}$ inches. Have them also count to $2 \frac{1}{8}$ inches, thus: $\frac{1}{16}$, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, etc.
- E. Have the pupils estimate, then find, the areas of several rectangular surfaces such as sheets of paper, book covers, table tops, rooms, etc.
- F. An interesting experience with area would be a discussion of the cost of different kinds of paint and the cost of painting the walls of the classroom.
- G. Find out if the area of your school ground is greater or less than an acre.
- H. Draw lines that you think are 2 inches, 4 inches and $5\frac{1}{2}$ inches

in length. Then measure them with a ruler to see if your estimates were right.

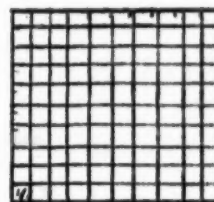
- I. Find the perimeter of the floor of your classroom.
- J. Make a speedometer drawing showing 2302 $\frac{1}{10}$ miles.
- K. Children can be required to make rough drawings like those below to show the meaning of different numbers.



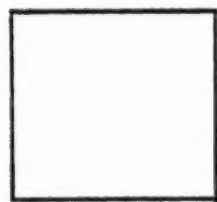
1 whole



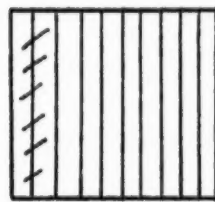
1 tenth



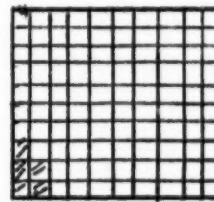
1 hundredth



1 whole



2 tenths



5 hundredths

IV. Social Applications of Arithmetic

- A. Make a time line of historical periods or events.
- B. Reduce foreign money to our values.
- C. Find distances between various points on maps.
- D. Plan, figure cost and measure equal portions of a school lunch.
- E. Calculate comparative costs of cash payment versus credit buying.
- F. Study the mathematical implications of the utilities, water, gas and telephone.
- G. Figure the annual expense of insurance and taxes on a house.

- H. Figure the annual per pupil cost of attending school in the local community.
- I. Keep a record of the family budget for one month.
- J. Make a scrapbook of number tricks and puzzles.
- K. Some children may find out about electric motors, generators and hydro-electric power. Have them report their findings to the rest of the class.
- L. Have children check with local merchants on the meaning of shoe sizes such as 9A or 10AA, etc.
- M. Assign the following to the more able students:
 - 1. The Dewey decimal system used in libraries.
 - 2. The mill as a unit of money.
 - 3. The use of decimal fractions in athletics.
 - 4. Weather reports in newspapers.
- N. The price of an item sold includes charges for many services. Have the class develop a list of charges included in the price of a wool suit.
- O. Have some pupil look up and explain how to read an electric meter. Try to obtain an electric bill and show how the rates for electricity are listed on it.
- P. Draw a time line showing five important events in the history of the United States.

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